Studying the associative properties of rhythm on the perception of emotion

Aaron Neff
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Studying the associative properties of rhythm on the perception of emotion

by

Aaron Michael Neff

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

MASTER OF FINE ARTS

Major: Graphic Design

Program of Study Committee:
Sunghyun Kang: Major Professor
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Ames, Iowa

2011

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*videos only available in pdf version*
ABSTRACT

Patterns surround us in our daily lives, nature itself is made up of a variety of complex repetitive patterns from the leaves in the trees to the cycle of the Earth around the sun. These sequences are not just found in nature but also our daily lives, walking, sleeping, and in our heartbeats. The human heart has a way of telling us if we are excited by beating quickly or if we are scared, by skipping a beat. Can these patterns translate into all aspects of our lives, particularly motion graphics? Can using different forms of rhythmic patterns, changing frequency, position, and shape, be formed into one of the five basic emotional responses?

Musicians have already proven their mastery of emotional responses with rhythm and tempo. Using particular beats musicians can encourage dancing, sadness, romance or any other response. Psychologists have studied people’s responses to music, using studies involving tone, successive notes and harmony. The responses to these studies have led psychologists to similarly study the juxtaposition of images and films.

The method of analyzing patterns as they relate to basic emotional responses has already been proven in a study by Ekman and Friesen (1971), where people around the world were shown facial expressions and they were asked to determine the emotion. This test showed a general ability for all humans to recognize shapes and patterns within facial expressions on a world scale. Another study involving films and their context of perceived emotion has been recorded by Philippot (1993), in which French films were shown to an American audience and they were asked to pick the overall emotion of the piece based on a small clip. This study determined that people could generally identify the proper emotion of the scene without knowing what was being spoken.
These psychological studies have proven that there are visual clues which allow an emotion to be recognized, and these emotions can be determined from a combination of static images or through video. Underlying these studies is the idea we recognize patterns from our genetics and culture which allow us respond in a particular way to individual situations, and if these combinations of patterns and rhythms work with the human face and gesture, then maybe the idea extends beyond our ability to see humanity.

This same concept of using rhythm in music to trigger emotional responses should transfer over into motion graphics. By using simple shapes to eliminate the associations brought with images, and by only changing the elements which form a pattern, this could reveal patterns that are seen as relating to a particular emotion. These patterns, both natural and man made, could be changing our emotional responses and visual experiences everyday.

In this study here, ten videos were created, two videos for each of the five basic emotions: anger, disgust, fear, joy, and sadness. Each video contained a short motion graphic of a circle creating various patterns of motion, between three and ten seconds in length and displayed within a standard resolution (720x480 pixels) DV NTSC format. The videos were displayed as part of an online survey, where each video was followed by a multiple choice question with seven answers, one for no emotion, one for each of the five basic emotions, and one write in where participants wrote in their own emotional response.

After the data was collected from one hundred and forty-five participants who took either one of two surveys the results showed that seven out of the ten videos had more than half the respondents describe an emotion present in that video. Of those videos four of them had a significant well above chance of selecting the same emotion.

These results show that further study into the use of non image related patterns to trigger
cognitive emotional responses should be taken, and that using patterns as a means of
transferring a message is now more of a possibility than previously thought. A new method of
creating design, motion graphics and videos can now be attempted.
CHAPTER 1. OVERVIEW

Rhythm is a complex but very predictable pattern of actions. Knowing when you have seen a rhythm depends on when you recognize the cycle. The same is true in the world of emotions, to determine what has caused an emotion is a challenge, but once you see the emotion on a person’s face or through their actions it too is easily recognizable.

This paper will attempt to define what is involved in the creation of both rhythm and emotion. After definitions of both subjects have been established an in depth look at film theory and previous studies is defined as the two definitions are combined into a workable methodolgy. The methodolgy used for this study which attempts to answer these three hypothesis.

1.1.1 First Hypothesis

The simple shape of a circle can be repeated in various patterns of movement, by varying the speed and location to create basic emotional responses, anger, disgust, fear, joy and sadness.

1.1.2 Second Hypothesis

These responses to the videos can be recorded in a measurable and consistent manner as to prove the responses are accurate at a beyond chance percentage.

1.1.3 Third Hypothesis

The responses collected will provide some measurable difference between the sexes, age groups, education level, and cultures.
CHAPTER 2. REVIEW OF LITERATURE

Rhythm is a concept, a metaphor, a timetable for daily activity, a descriptor for fluidity in sports, the key to cycles in nature and all life, and a backbone for art. In the realm of the sonic art and music, rhythm was succinctly described by Charisius, a Roman grammarian ca. 400 A.D.: “rhythm is flowing meter, and meter is bonded rhythm.”

The word rhythm comes from the Latin rhythmus and the Greek rhythmos both meaning to flow. Everything flows in rhythm through time. Everything we do - walking, talking, breathing, sleeping, working and thinking - we do in rhythm as we flow through time. Events flowing and unfolding in time sculpt, shape, and divide time. Any and every action shapes time in some way. These shapes of time can be long or short, can repeat or occur just once.

Physical objects are patterns of shape, color, consistency, mass, and texture. Actions occur in patterns of motion; language in patterns of letters, words and thoughts; history in patterns of development; and music in patterns of sound. While repetitive rhythms are easier to perceive, all events - marbles thrown across the floor; leaves rustling in the wind; the birth and death of beings, things, or civilizations - describe some rhythm. There’s an infinite variety of actions and events, so there’s an infinite variety of rhythms, and there is one we all share: the rhythm of our planet Earth as it flows, rotating and revolving around and around through space and time. There’s an infinite variety of patterns, and an infinite variety of patterns of time.

2.1.1 Comprehension of a Rhythm

People can fairly easily comprehend a rhythm and accompany a rhythm with a regular succession of sounds. This phenomenon spontaneously appears in certain children toward one year of age, something even earlier. This accompaniment tends to be a synchronization between
sound and tap - that is to say, that the stimulus and the response occur simultaneously.

It is no accident that the traditional metronome was created to provide a pulse that is more or less within the range of the heartbeat’s rate, from about 40 beats per minute, the rate of an athlete at rest, to about 200 beats per minute, the uppermost heart rate. The range in which we feel a pulse is the range at which the human heart beats.

Our musical aptitude of rhythms is actually a bundle of related skills, as it involves recognizing timbres (which allows us to identify vocalists and musicians by the characteristic sounds of their voices and instruments), judging intonation, tracking melodies and melodic contours, applying a knowledge of standard musical forms and lyrical building-blocks and metrically entraining in the most sure-fire manner to grasp and anticipate the unfolding rhythms. Our metric skill in musical contexts is related to other skilled rhythmic behaviors, such as speech production and comprehension, our auditory and visual tracking of moving objects, and most important our kinematic or motor control behaviors from walking, running, dancing and participating in sports. All of these activities require rhythmic control of our own bodies as well as temporal coordination with others, and we have many opportunities to practice these behaviors, starting in early childhood. Musical performance requires additional skills, but the skills involved in musical performance rest on a substrate of basic rhythmic skills. The more familiar we are with a particular kind of rhythm, the more skilled our attentional behaviors tend to become.

2.1.2 Theory of Rhythm

The idea of a rhythm is a conception of our own humanity. It is our nature to make sense of the patterns we are identifying and its this constant interaction between the physically
measurable properties of a sequence and the human perception of those properties that creates the rhythm. While listening to a metronome almost invariable, listeners begin counting the clicks. The inner ear may count 1-2-1-2 or perhaps 1-2-3-1-2-3. Many people report hearing 1-2-3-4-1-2-3-4. Almost no one hears this as it truly is: a repetition of exactly identical clicks. Consider the implications; the ear creates an ordered pattern where none objectively exists.

Rhythmic knowledge is nonverbal, yet operates in a hierarchical, multi-tiered fashion analogous to language with “notes” instead of “phonemes” and “musical phrases” instead of “sentences.” Rhythmic phenomena express a kind of meaning that is difficult to express in words - just as words express a kind of meaning that is difficult to express in rhythm.

Among the oldest metaphors for rhythm are the motions of the bodies of the solar system such as the daily path of the sun, moon and the cyclical behavior of the planets. Many plants have rhythmic behaviors and rhythmic structures: The daily opening and closing of a flower, the yearly cycles of a tree shedding and regrowing its leaves, the bamboo plant with its long stalk punctuated at semi-regular intervals by knots. A necklace of beads provides as analogy in which the beads represent the regular beats while the circularity represents the repetitive metrical structure. Each sand grain dropping through a sand clock is metaphorical of a tiny grain of sound, and the regularity of sand grains passing through the neck represent the regularity of the musical experience.

2.1.3 Rhythm Definitions

When talking about rhythm there are invariably some definitions which are created to help identify particular aspects of a rhythm. Meter is the organization of the pulse, and the pulse is a steady repetitive action created in nature or within one’s mind concerns larger groupings at
multiple levels. Meter is typically characterized as a periodic alternation between strong accented beats and weak unstressed beats. A beat is accented when it is aligned with events from levels above and/or below it in the metric hierarchy. A beat is unstressed when it does not coincide.

When a pattern starts to repeat itself, then it has completed one period. Western music theory and practice view these levels as a hierarchy of regular successions. Just as audible events are clustered into beats, beats can be grouped into measures, measures collected into phrases, and so on up through the highest levels of organization.

Beats are time points. The temporal continuum of most traditional music consists of a series of more or less evenly spaced beats: the meter of the music. Pulses, however, are flexible, and they are rhythmic. A pulse is literally heard, not intuited the way a beat is. Pulse is susceptible to rhythmic accent, while metric accents are applied to beats. Any succession of up and down, in and out, round and round, or expansion and contraction creates some kind of pulse, sometimes obvious, sometimes subtle, sometimes perfectly in time, sometimes not. The various classes of rhythms represent different ways of conceptualizing rhythm and they correspond to different ways of perceiving the rhythm. Additive rhythms begin with short segments that are added together, while divisive rhythms begin with a whole and successively divide it into smaller pieces. Thus additive rhythms are constructed and understood from the top down.

Steady repetitive rhythms are called periodic rhythms. Anything that happens over and over at a consistent rate creates a periodic rhythm. Periodic rhythms, repetitive patterns, are basic to the world as we know it; they’re the structure, the temporal foundation, the building blocks of the universe - the way the universe works.

Any specific, or specified, duration of time, is a period. The term usually refers to the amount of time it takes to complete one action. In matters of time, the word cycle is often
interchangeable with period, but it is more specific. A cycle is always made up of periods, but
you can have periods without cycles. A period can happen once, like a gesture, like the time it
takes for a single action, era, or historical event. Picasso’s blue period, never came around again.
But a cycle keeps coming around again and again.

Pattern is a term for a recognizable cycle arranging material, energy, time, or thought.
While it can be singular, as in the pattern of a rock, it usually implies repetition of form. The
universe is organized and unfolds in patterns. The frequency refers to the number of times a
pattern occurs in a specific period of time. Frequencies range from extremely fast, from the
frequency of the birth of galaxies to the frequency of photons hitting your retina from a stream
of light. When discussing frequency of cycles, the word per is used. Sometimes well known
frequencies include 12 months per year, 7 days per week and 24 hours per day. Sixty is the
frequency of both minutes per hour and seconds per minute. There are 1,000 milliseconds per
second, so 1000 is the frequency of milliseconds per second. There is always a number
associated with or implied by a frequency.

In music, when the frequency is per minute, it is called beats per minute (bpm), and it
defines the tempo. When the frequency is per second, it is called cycles per second, and it
defines the pitch. In video frequency is measured in frames per second. Standard television runs
in 29.97 frames per second. Moved animated in a traditional fashion, run 24 frames per second,
and frame rates can go as low as 12 images per second, if each is shown twice at a rate of 24
frames per second. In music the word frequency is often interchangeable with the word pitch.
Two important reference frequencies in music are (1) half seconds - that is, 120 beats per
minute, also called march time, and (2) 440 cycles per second, which is the pitch A-440 used for
tuning.
Just as there are periodic rhythms, so are there nonperiodic rhythms - rhythms that do not repeat over and over again. A rhythm can happen just once, and that’s it. Nonperiodic rhythms, instead of having to do with structure, usually occurs when something falls apart. The marbles thrown across the floor create a unique rhythm once, and never again. That’s called a rhythmic gesture. Very slow rhythmic gestures are difficult to discern. A boulder sitting in a field, created and dissolving at an imperceptible rate, is a very slow and rhythmic gesture.

Any rhythmic pattern has a variety of means by which it can be rearranged, broken up, or created. These variations can turn a steady rhythm into a entirely new one or simply accentuate a rhythm giving it a new meaning or emphasis. Listed below are ten ways to bring variation to a rhythm:

(i) dynamics: varying the intensity or loudness of strokes  
(ii) bending time: slight purposeful deviation in timing  
(iii) displacement: shifting the placement of a motif in time  
(iv) ornamentation: ghost notes that may occur slightly before or after a stroke  
(v) repetition: repeating a given phrase or motif  
(vi) segmentation: partitioning long phrases into shorter ones  
(vii) augmentation: combining smaller phrases into larger one  
(viii) doubling: hitting two strokes where normally one would  
(ix) pausing: resting when normally there would be a stroke  
(x) substitution: exchanging one kind of stroke for another

The clearer a rhythm, the better its performance. The more clearly each note, phrase and dynamic is defined the better, and rhythmic clarity of the strokes can be achieved by thinking about the following:

Pulse  Shape  
Meter  Length  
Articulation  End  
Distance between  Fullness of the rests  
The dynamics of each moment  The rhythmic shape of the phrase  
Rhythmic “placing” - early, late, right one

(Lewis, p.g 4.6)
While there are many similarities between visual and auditory perception when it comes to rhythm, there are also significant differences. For example, in 1886, Mach demonstrated that spatial symmetry is directly perceptible to the eye whereas temporal symmetry is not directly perceptible to the ear. Unlike vision, the human ability to parse musical rhythms inherently involves the measurement of time intervals. Therefore, visual rhythms unfold in space while auditory rhythms evolve over time.

2.1.4 Rhythm Types

Interestingly, we do not appear to be able to sense rhythmic phenomenon directly in either the olfactory (smell) or the gustatory (taste) senses. We are however fascinated with rhythm using rhythm in its orderly recurrence in any domain. In visual rhythm it may involve alternations of light and dark, of up and down, of colored patterns, or of symbols. In tactile rhythms it may involve alternations between strong and weak or as in architectural rhythms lie in the motion of bodies. Architectural rhythms may also be built from repeated structural or decorative elements such as windows, columns, and arches. A thought by Donald Norman, a cognitive scientist, may help understand our fascination with rhythm.

“Emotions, we now know, change the way the human mind solves problems - the emotional system changes how the cognitive system operates. So, if aesthetics change our emotional state, that would explain the mystery.” (Norman, 18)

2.2 PSYCHOLOGY OF EMOTION

Until recently, emotion was an ill-explored part of human psychology. Some people thought it an evolutionary leftover from our animal origins. Most thought of emotions as a problem to be overcome by rational, logical thinking. And most of the research focused upon
the negative effects of emotions such as stress, fear, anxiety, and anger. Modern work by neuroscientists, cognitive scientists, and psychologists have reinvented our view of emotions. Science now knows that from an evolutionary perspective more advanced animals are more emotional than primitive ones, with the human being the most emotional of all.

In nature, emotions are concerned with the bodily aspect, the facts and our limitations. In this environment emotions occur as survival necessity, outside voluntary control. In culture, emotions are concerned with our imagination, plans and aspirations, which continually changes with the limitless possibilities technology has granted us. It is through these two worlds, nature and culture, that we are required to communicate with others, and ourselves.

This communication takes place within the individual because parts of the cognitive system are somewhat autonomous. This emotional system controls the muscles of the body and through chemical neurotransmitters and change how the brain functions. These chemical signals activate muscle systems to get us ready to respond, and to serve as signals to others we encounter. These signals provide a powerful role of emotion as communication through our body posture and facial expression which give others clues to our emotional state. With incomplete access and incomplete control of each part, through a hierarchical system, the topmost level receives signals from lower-level parts and invokes them to try and achieve goals as components of larger plans.

This analysis of augmented planning points to a significant feature of the human cognitive system. Almost all plans involve subplans, and each of these subplans may be achieved by a separate part of the system. Orchestrating a whole plan, involves coordinating parts or procedures and communication among the parts.

This division of plans into subplans and sub-subplans can help one understand that
decisions prompted by emotions are not perfectly rational, but this is due in part to the underlying processes, which have had the advantage of surviving evolutionary selection when fully rational solutions were not available.

Oatley and Johnson-Liard’s hypothesize that there are control signals that correspond to basic emotions. Each occurs when a particular kind of juncture is recognized. There are five basic emotions, each with a junction that typically trigger them, and the transitions of action readiness that accompany them. An emotion is experienced when one of these pervasive signals is broadcast throughout the system.

Potential evidence about the existence of basic emotions is available from phenomenology, preoccupying cognitive states, physiological and expressive accompaniments, eliciting conditions, the action consequences of emotions, and from the ways in which emotions develop in infancy.

Among the criteria for a basic emotion are that it is physiologically and expressively distinctive with a biological basis, but what is there to suggest just a small number of basic human emotions? Many writers have postulated certain fundamental emotions

One account of this possibility posits a set of basic emotions. There are at least two specific ways that the idea of basic emotions has been used in literature. One is that a small set of emotions, the basic emotions, are the fundamental elements of emotional life that can be combined to produce other, more complex emotions, in a way similar to colors (e.g., Barrett, 2006, Ortony and Turner, 1990). The second idea, and more popular, of basic emotions insists on the idea that there are a small number of emotions that have a biological basis and that are encoded in the genes (e.g. Ekman, 1984; Izard, 1977; Johnson-Liard and Oatley, 1992; MacLean, 1993; Plutchik, 1984; Tooby and Cosmides, 1990) This definition is strongly associated with the
evolutionary theory of emotion. Thus, different theorists have proposed different numbers of basic emotions emphasizing to greater and lesser extent the different types of data relevant, but most basic emotion theorists do consistently include the five emotions, which are joy, sadness, anger, disgust, and fear among the basic emotions, sometimes adding surprise (e.g., Ekman, 1984; Izard 1977, Johnson-Liard and Oatley, 1992; Plutchik, 1980; Tomkins, 1962, 1963) (Niedenthal 43)

Oatley and Johnson-Laird (1996, p. 365) have aptly noted: “The precise number of basic emotions is less important than the hypothesis that each kind of emotion has specific functions and that mechanisms that evolved to serve these systems map diverse events into a small set of emotional modes.”

Oatley and Johnson-Liard (1987) have also proposed that the function of emotions is communicative. Emotions communicate both to ourselves and others; within the cognitive system they communicate among the different parts of the system; and in a social group they communicate among individual people.

Moreover, emotions play a critical role in daily lives, helping assess situations as good or bad, safe or dangerous. Positive emotions are as important as negative ones - positive emotions are critical to learning, curiosity, and creative thought, and today research is turning toward this dimension. One finding, by psychologist Alice Isen and her colleagues has shown that being happy broadens the thought process and facilitates creative thinking. Isen discovered that when people were asked to solve difficult problems, ones that required unusual “out of the box” thinking, they did much better when they had just been given a small gift - not much of a gift, but enough to make them feel good. When you feel good, Isen discovered, you are better at brainstorming at examining multiple alternatives. And it doesn’t take much to make people feel
good. All Isen had to do was ask people to watch a few minutes of a comedy film or receive a small bag of candy. (Norman 18)

Oatley aptly states that “an understanding of emotions depends on more elements than, say, an understanding in physics. In physics we can identify three elements: events, qualitative descriptions of these events with reliable quantitative measurement, and theories for drawing valid inferences about the events.” Emotions on the other hand, transcend human consciousness. (Oatley 414). Cognition and affect, understanding and evaluation - together they form a powerful team.

2.2.1 Holistic Framework

It is from this understanding of the communicative process that Torban Grodal hypothesized, that within visual fiction, cognitive and perceptual processes are intimately linked with emotional processes within a functionally unified psychosomatic whole, what he calls the holistic framework.

This holistic approach therefore expands a structural and a cognitive narrative analysis in order to describe the way in which cognition, emotions, and feelings interact in narrative flow. Because visual fictions are experienced in time, the interaction between cognition and emotion will be concerned with temporal flow, and the way in which situations relate to the intentions and abilities of the character/narrative.

A holistic framework for describing cognition and emotions in visual fiction necessitates descriptions on several levels. The description encompasses a physiological level (heartbeat, sweat, and so forth), a human being’s mental state, and usually also a scenario, a story-situation that defines cognition and the emotions. Some feelings may be generated from interior sources,
like memory, have to be cued by some exterior means.

For exterior sources we perceive light with the eyes, sound with the ears, and smells with the nose, but rhythm is the most basic way we understand and interact with time. Our first sensory impression as we float in our mother’s womb is the rhythmic sound of her heart. The time between the opening and closing of the heart’s valves is a clock that measures the passing of our lives.

A heartbeat and breathing is our most lasting experience of rhythm, and yet even longer time intervals, such as day turning into night (cognition) or a dance or piece of music (perception) can still be recognized as a rhythm. This is because sensory impressions are bound into coherent objects of perception; these objects are themselves grouped together based on similarity or proximity. Short term memory is where patterns such as words, phrases, melodies, and rhythms are gathered into perceptual streams. Long term memory is where larger cognitive structures and conceptual categories are stored; abstract ideas, forms, language, poems, and songs. Long term memory is not a passive receptacle where short term memories retires. Rather, there is a constant interplay between short and long term memories. Whenever an object is present in short term memory, it activates similar objects from within long term storage; these are then circulated again in parallel with the new events.

These memories are an outcome of the narrative process. Here this collection of our emotions, perceptions, and cognition will remain until the memory is activated again. Our cognition and future perceptions will continue to reshape the emotional experience we had or will have in sometimes subtle, sometimes major ways. To understand more about how the emotion was shaped will require a closer look at cognition and perception itself.
2.2.2 Perception

One of the first steps to understand emotion begins with basic perception. Rays of light enter the eye and activate the millions of rods and cones there. The brain makes its first analysis of input. It will try to analyze color, contrast, and so forth, and find figures, ground, and spatial dimensions. This process creates perceptual intensities without any meaning in the ordinary sense of the word. Many abstract paintings and many experimental films try to produce an input that can only be processed at a Step I level, as in Pollock’s paintings and Brakhage’s film.

The second step consists of memory-matching. If Step I has produced, say, an animal-like figure, the brain runs through its memory-files of animal shapes in order to match it and determine its identity. To keep this explanation simple, I am omitting the feedback loops of top-down procedures, and pretending that all this takes place in a bottom-up fashion.

The brain searches its memory-files for possible matches, aided by feelings of familiarity or unfamiliarity. The items in the memory-file are not only stored by, say, visual structures, but also with affective values, affective labels. If the match of the figure is snake, then the item will surface in consciousness with its visual features and with its affective value, fear. To be conscious of snakes implies weaker or stronger simulation of an affect or emotion: fear, say. If the match is Marilyn Monroe or a teddy bear, the match will evoke erotic or tender feelings. If the figure input is complex, say snake + grizzly bear + Marilyn Monroe + teddy bear, the match-activation of the memory-files will, of course, evoke complex, mixed feelings.

If a film concentrates its representations on a Step 2 level by merely showing different visual items that activate a set of memory files, the effect of the films is normally labeled “lyrical.” This is what happens in many music videos and some commercials: the activation of
networks of associations. The effect may be enhanced by making the matching procedure
difficult, so that the brain has to activate many items in many files in order to make the match.
These saturations create perceptual qualities which are fused with anthropomorphic or
zoomorphic effects and emotions in a preoperational state.

Processing can stop at Step 2 in lyrical film sequences, possibly combined with activation
of autonomic response, as when certain sentimental or melancholic associations evoke tears. But
in most narrative films, Step 2 processing immediately leads to Step 3, which consists of relating
and contextualizing the items seen and determined in Steps I and 2 to a living being and a scene.

Step 3, the cognitive-emotional appraisal and motivation phase. Snake or Marilyn are
now put into the framework of a hypothetical narrative scenario. Snake represents possibly
lethal danger for Marilyn, and the viewer experiences strong arousal, while the body-mind is put
onto red alert with heartbeats, sweat, adrenalin secretion, and so forth. In order to produce and
label the arousal, the viewer has to identify with one of the agents: say, identify with the little girl
and not identify with the poisonous snake approaching her. Then the arousal can be labeled fear.
State 3 is not a stable state: strong arousal needs an outlet, because arousal states normally
activate telic arousal-reduction procedures (otherwise paratelic evaluation is activated). If no
cognitive, voluntary or autonomic outlet, is found for the scenario, it will regress to Step 2.

That the focus of attention at a given moment is directed toward a certain concept- or
schema-level does not mean that the features constituting the concept or the schema have
disappeared from consciousness. They are activated, but their determination of the concept or
schema does not have conscious salience. We can give conscious salience to the determiners, for
example, by asking what is understood by a given concept, or by trying to reveal the underlying
network of associations.
Psychologists have investigated the activation of networks of associations by investigating associative priming, that is, the way in which one phenomenon activates an associative network and by that facilitates mental operations on the items in the activated network (see for instance, Anderson 1990a: 160 ff.). An example of these experiments is the ability of subjects to judge whether a given word is real or meaningless; the subjects were faster in answering when the words were related, like bread and butter, than when they were unrelated, like nurse and butter. Such findings make it probable that a given phenomenon with varying intensity activates a large network of associations below the threshold of consciousness. It would be a mistake to equate this activation, however, with connotation: bread does not connote butter, butter is an item in the network of associations surrounding bread and providing it with meaning. Some associations, such as the features constituting the propositional structure of a concept, will be more central than others, and terminology describing the centrality vs. non-centrality of a feature is more adequate than terminology describing denotation-vs.-connotation. The dichotomy of central and peripheral suggests a gradation, whereas denotation suggests a water-tight set of features defining denotation. Denotation is often understood as implying objective features and existence as opposed to subjective features expressed in connotations.

### 2.2.3 Cognition

Cognition is represents the actual thoughts carrying on in our minds at any given moment. These are high level mental abilities which allow us to recognize, remember, and recall complex patterns over long periods of time. However, the conscious feeling of an emotion-- fear or sadness or a similar emotion -- is not identical with the evaluation or the state of readiness. An underlying mental state is the core of an emotion. Common with most mental states, only
limited aspects of it are conscious. These underlying mental states of an emotion are typically accompanied by one or more of the following:

- **Conscious preoccupation**: Emotions have attentional properties. They often include a preoccupying and even compulsive inner dialogue. In this state, we may find it difficult to stop thinking about the issue.

- **Bodily disturbance**: An emotion is typically accompanied by a bodily disturbance involving the autonomic nervous system and other physiological processes. Skin temperatures may rise, heartbeats might accelerate.

- **Expressions**: Emotions are often outwardly expressed by recognizable facial gestures, bodily postures, and tones of voice that are not entirely voluntary. For instance, happiness typically involves smiling, particular patterns of muscle movements around the eyes, and a lightness and spontaneity of speaking.

Oatley, 19

Though rhythms surround us in both the physical world and the animate world, humans are among the only creatures who create rhythmic patterns consciously. From the age of about three to four years a child can tap along with the metronome or a song. This is significant not because of the regularity of the tapping but because of the synchrony: children learn to recognize the regularity of the pulse and then anticipates successive pulses in order to tap at the same time. This listening to music and speech and their own experiences of talking and singing teach about the concepts of time, temporal relationships, and how to use our own rhythms.

### 2.2.4 Rhythm and Motion, The Basic Visual Experience

Vision is our major experience of the rhythm that surrounds us, but there is a difference between a photograph (or a painting) and motion pictures just like there is a difference between a lyrical poem and a narrative. A still or a photograph is “dead and lifeless” yet still saturated with special emotions. It is present in front of our eyes, but also absent in the sense that it clearly shows itself to be a trace of something else, a past, an elsewhere which only reaches the spectator via the shadows of the electronic or photographic record. It has lost its sequential,
open, and undecided meaning.

The basic fact is true, that the juxtaposition of two separate shots by splicing them together resembles not so much a simple sum of one shot plus another shot–as it does a creation. It resembles a creation–rather than a sum of its parts–from the circumstance that in every such juxtaposition the result is qualitatively distinguishable from each component element viewed separately. At this late date no one need really be reminded that quantity and quality are not two different properties of a phenomenon but only different aspects of the same phenomenon.

The same circumstance is often found in riddles–for example, this one from international folk-lore: “The raven flew, while a dog sat on its tail. How can this be?” We automatically combine the juxtaposed elements and reduce them to a unity. As a result, we understand the query as though the dog were sitting on the tail of the raven, while actually, the riddle contains two unrelated actions: the raven flies, while the dog sits on its own tail. This tendency to bring together into a unity two or more independent objects or qualities is very strong, even in the case of separate words, characterizing different aspects of some single phenomenon.

It has been said: that the whole is more than the sum of its parts. It is more correct to say that the whole is something else than the sum of its parts, because adding the sum together is a meaningless procedure, whereas the whole-part relationship is meaningful.

The primary film experience should be linked to the way in which the spectator relates to the film-image per se as a mirror-image of himself. The film-image should be imaginary, an image of something absent, although the viewer denies this. Imagination is here platonically understood as something that has no function in ordinary life except as a cause of illusion.

Motion is therefore normally not only perceived as a succession of frames, like a succession of isolated film frames, but, as a result of a space-time system that has its own
intensities, it is felt in the live quality of motion pictures.

The visual system has three prominent subsystems, one concerned with the analysis of dynamic form (for example, bodies dancing), one concerned with color and form-with-color, and one devoted to analyzing signals about motion. From an evolutionary point of view, the motion detecting system is older than shape perception, and the edge of the retina is only sensitive to detecting motion.

Therefore the live quality of film and television is no more an illusion than object recognition by means of a picture; the live quality is the felt aspect of an activation of functions necessary for constructing motion in the world as well as on film.

2.2.5 Sequencing, How a Rhythm Begins

Sequencing is a tool for controlling those meanings that should be ‘fore-grounded’ and which should function as background in a given text, and it is thereby also a tool for making complex configurations, but besides background and foreground there are other ways of creating an attentional hierarchy in visual fiction.

The problem has an emotional side, too, which can be illustrated by the emotional difference between perceiving meaning by language and perceiving it by visual representation. An arbitrary system of signification consists of three elements, a signifier, an associative pointing relation, and a signified. A signifier will activate a search process leading to a possible activation of the signified. The signified could very well be an image-concept, as when the signifier tree activates a set of propositions or an image constituting the concept. But by an analogical representation of a tree, there is no pointing function: identification of the signifier will instantaneously provide the signified, although construction of images and the associations
determining them is in itself a very complicated mental process. The pointing, signifying
function is felt as meaningful, so that even if a novel and a film express the same concepts, the
novel would be felt as more meaningful because of the additional tensity created by the point
function of the arbitrary system of signification as opposed to the greater intensity of the visual
representation combined with the familiarity/unfamiliarity feelings characteristic of visual object
recognition (see Pribram 1982 and Jackendoff 1987: 306). To deny any meaningful, intelligent
qualities to a purely visual medium may be more emotional than an analytical. Many typical
associations are not meaningful in the ordinary sense of the word. Basic aesthetic phenomena,
such as rhythm or melody in music, group-structure in visual art, or alliteration in literature,
represent mental associations, but need not have any strict meaning. A classic gestalt problem,
grouping, means that we can chunk together associated subgroups of the phenomena, and per-
ceive the chunked result by means of some kind of second-order schema. The following dots
will be chunked into groups of significant proximity. Instead of seeing sixteen dots, we see four
groups of four dots. .... .... .... ....

Although perception of the dots creating four groups has no meaning, it certainly
has a salience or a felt significance that is higher than would ordinarily be felt if the dots were
distributed on the page at random or if they were printed without intervals, so that they could
only be perceived as if they were printed without intervals, so that they could only be perceived
as a line made up of dots instead of a line made up of groups of lines made up of four dots. The
verbal description of the result is ad hoc, but many phenomena of low-order grouping acquire a
permanent name like symmetry.

At the other end of the spectrum of associations, we have fully meaningful associations,
as when wall, roof, window, door, and chimney, are chunked together and produce the
conventional word for the associated group: house. But the mechanism of association may be the same in both cases and the feelings of intensities concomitant with the activation of associations will often be graduations of the same type of feeling of significance, whether the association is purely perceptual, as in many types of aesthetic associations, or is made between propositional elements. Jackendoff (1987: 306) says of language that the affect meaningful and the phonological structure are present to our awareness, but the conceptual structure is not. A series of characteristic and similar shots in a film might, for example, be associated by the viewer, and this will create an intensity of association similar to that of meaningful associations; in addition, the intensity will possibly trigger an effort to interpret in order to convey a full meaning to the associations.

In Gestaltist language, grouping means that the whole is more than the sum of its parts. The whole is a description of the result of the interaction of the parts: it does not imply a mysterious essence. Another way of expressing this is to say that we establish a phenomenon, a concept, or a schema, for which the associated features and aspects are determiners. When we see a robin, we normally perceive a structured group of associations, in which beak, wings, eyes, and other elements are features specifying the concept robin. When we see a parade, we perceive the individual soliders and their movements as features specifying the schema march. A given format and a given focus of attention will prefer a concept or schema, but the concept-centripetal associations do not rule out those between those organized or unorganized.

### 2.2.5 Synchronization of Cognition and Rhythm

In 1665, the Dutch scientist Christian Huygens was working on the design of a pendulum clock. He noticed that when two clocks were mounted connected by a wooden beam, the
pendulums began to swing in unison. Whenever one pendulum swung left, the other swept right; when the one moved right, the other swayed left. When Huygens unmounted one of the clocks from the support, they gradually fell out of step. He concluded that tiny vibrations caused by the swinging of the pendulums were conducted through the beam, coupling the motions of the two clocks. This kind of process, where oscillators interact to achieve synchronous behavior, is called entrainment.

Since then, entrainment has been conceptually observed throughout nature. Individual heart muscle cells each pulse at their own rate; when two cells are placed close together, they begin pulsing in synchrony. The period of rotation of the planet Mercury is in a 3:2 relation to its period of revolution around the Sun. In Thailand, thousands of fireflies gather in the trees at nightfall. At first, their flashing is random and scattered, but over time they become increasingly entrained until eventually they are all flashing simultaneously on and off. These are just a few examples of many found in nature, and this same concept can be applied to humanity as colors can relate a common meaning among a group of people such as green with envy.

Closely related to entrainment is the idea of one oscillator synchronizing to another (but without feedback from the second to the first). This occurs, for instance, when the sleep cycle becomes synchronized with the daily cycle of light and dark. In mammals, circadian rhythms are generated by a pacemaker in the brain’s hypothalamus which contains about 1600 neurons. Researchers believe that each neuron acts as an oscillator with an average period of about 24.3 hours. The neurons are coupled together and driven by light, which causes them to synchronize to the solar day. Certain species of clams synchronize their behavior to the tides; even after being removed from the ocean they continue to open and close for several days at their habitual rate.
2.2.6 Rhythm Creates a Flow

Both entrainment and synchronization play important roles in our understanding of rhythm. It is easy for people to synchronize body motions to repetitive stimuli. Picture and music are complex oscillators with a defined frequency. While listening a second equally complex oscillator must synchronize to the first in order to interact with stimuli. Synchronization is easy for most people and occurs rapidly, typically within a few repetitions.

We become attached to things if they have a significant personal association, if they bring to mind pleasant, comforting moments. Perhaps, more significant, however, is our attachment to places. Favorite corners of our homes, favorite locations, favorite views. Our attachment is really not to the thing, it is to the relationship, to the meanings and feelings the thing represents. Csikszentmihalyi and Rochberg-Halton identify “psychic energy” as the key. By psychic energy by which we mean mental energy, mental attention. Csikszentmihalyi’s concept of “flow” provides a good example. In the flow state, you become so engrossed and captured by the activity being performed that it is as if you and the activity were one: You are in a trance where the world disappears from consciousness. Time stops. You are only aware of the activity itself. Flow is a motivating, captivating, addictive state. It can arise from transactions with valued things. “Household objects” say Csikszentmihalyi and Rochberg-Halton, “facilitate flow experiences in two different ways. On the one hand, by providing a familiar symbolic context they reaffirm the identity of the owner. On the other hand, objects in the household might provide opportunities for flow directly, by engaging the attention of people.”

Flow helps to integrate the self because in the state of deep concentration, consciousness is unusually well ordered. Thoughts, intentions, feelings, and all the senses are focused on the
same goal: Experience is in harmony. And when the flow episode is over, one feels more “together” than before, not only internally but also with respect to other people and to the world in general. The self becomes complex as a result of experiencing flow. Paradoxically, it is when we act freely, for the sake of the action itself rather than for ulterior motives, that we learn to become more than what we were. When we choose a goal and invest ourselves in it to the limits of our concentration, whatever we do will be enjoyable. And once we have tasted this joy, we will redouble our efforts to taste it again. This is the way the self grows, and when all a person’s relevant skills are needed to cope with the challenges of a situation, that person’s attention is completely absorbed by the activity. There is no excess psychic energy left over to process any information but what the activity offers. All the attention is concentrated on the relevant stimuli.

In normal everyday existence we are the prey of thoughts and worries intruding unwanted into consciousness. Because most jobs, and home life in general, lack the pressing demands of flow experiences, concentration is rarely so intense that preoccupation and anxieties can be automatically ruled out. Consequently the ordinary state of mind involves unexpected and frequent episodes of entropy interfering with the smooth run of psychic energy. This is one reason why flow improves the quality of experience, the clearly structured demands of the activity impose order, and exclude the interference of disorder in consciousness.

When a person becomes so dependent on the ability to control an enjoyable activity that he/she cannot pay attention to anything else, then he loses the ultimate control: the freedom to determine the content of consciousness. Thus enjoyable activities that produce flow have a potentially negative aspect: while they are capable of improving the quality of existence by creating order in the mind, they can become addictive, at which point the self becomes captive of
a certain kind of order, and is then unwilling to cope with the ambiguities of life.

The good things in life do not come only through the sense. Some of the most exhilarating experiences we undergo are generated inside the mind, triggered by information that challenges our ability to think, rather than from the use of sensory skills. As Sir Francis Bacon noted almost four hundred years ago, wonder - which is the seed of knowledge - is the reflection of the purest form of pleasure. Whenever people are in flow, either at work or in leisure, they reported it as much more positive experience than the time they are not in flow.

Although flow always involves the use of muscle and nerve, on the one hand, and will, thought, and feelings on the other, it does make sense to differentiate a class of activities that are enjoyable because they order the mind directly, rather than through the meditation of bodily feelings. These activities are primarily symbolic in nature, in that they depend on natural languages, mathematics, or some other abstract notation system like a computer language to achieve their ordering effects in the mind. A symbolic system is like a game in that it provides a separate reality, a world of its own where one can perform actions that are permitted to occur in that world, but that would not make much sense anywhere else. In symbolic systems, the “action” is usually restricted to the mental manipulation of concepts.

2.3 ROLE OF EMOTION IN ART AND HUMANITY

Artists have found ways to use visual media to code pleasurable formal patterns, complex events, and subtle emotions. By decoding such information viewers can share states of being that would otherwise not be accessible to them.

But without training, the skills of seeing and of interpreting what is seen remains latent. Most people in our culture are not aware of the range and intensity of the enjoyable experiences
available to them through the sense of vision. Visual illiteracy may not be a social problem in terms of economic productivity, but it does detract from the quality of life and leads to a cultural impoverishment that is very real. If the value of a society is measured by its ability to develop fully the potentialities of its members, then the making of visual beauty and learning how to enjoy it should become important items for society as a whole.

2.3.1 Art as Motivational Force

Feelings and emotions are motivational forces, but they also represent a set of experienced tones characterizing different holistic body-mind configurations in our experience of everyday life and of visual fiction. Fictions are experienced as, for example, sad, funny, romantic, or melancholic. They are also experienced with some modal qualities: tense, intense, saturated; whereas terms like lyrical or sublime may be conceived as lying somewhere between bigger feelings like sadness and qualities like saturated. The emotional toning of experience is not a bounded phenomenon like the motivational aspect, which takes place only in connection with a given agent, time, phenomenon, although tones and formal qualities fluctuate.

The emotional toning is an essential feature of consciousness, but has an extra prominence in temporal arts. This is because the mental processes of cued in viewers possess a salience and vividness larger than life. Understood in the sense that cognition, emotions, memories, and acts are constructed in a more concentrated and characteristic way than is typical in everyday life. The emotions and the emotional toning play a very important role in our preferences for visual fiction. A given viewer at a given time will often want to see something funny, lyrical, tense, thrilling, sublime, or tear-jerking. One prominent way of categorizing visual fiction in relation to consumer information is by emotion evoked: horror, comedy,
melodrama, or thriller. Thus the writer sets out to write a film categorizing one of these emotional qualities in their story from the very beginning, just like an artist would create a message or meaning within their work before they begin.

A central purpose is to investigate the way in which emotional tone and modal qualities vary in relation to narrative structure and to the mental process activated. Different types of film emphasize different types of mental processes. In an action film there is a close relation between perceptions, emotions, and acts; in a lyrical film perceptions, emotions, and memories are often cued without strong explicit connections to acts. Horror films present perceptions and emotions in relation to passive protagonists and an aversive excitement; melodramas of passion also present perceptions and emotions in connection with passive agents, but linked with a more symbiotic excitement.

There is also the problem of time course, or of how emotions unfold over time. It could be that for a while all of the component processes usually cohere and all point to the same emotional experience, but then later process come into play to decouple them. For example, it could be that after all components of emotions come together to define the state of amusement, other processes intervene to control or change that state, perhaps because the state is considered unacceptable in the current social situation. The fact that emotion components can be decoupled over time does not necessarily mean that they do not initially occur in a coherent way, particularly when the opportunity to do so is present. Because of the lack of opportunity to act, and because of the absence of time course analyses of emotion at this point in time, we cannot even say with certainly if the components of emotions do or do not typically cohere.

2.3.2 Motivation and the Brain
Motive and emotion share the same Latin root, motere, which means “to move.” Emotions are, literally, what move us to pursue our goals; they fuel our motivations, and our motives in turn drive our perceptions and shape our actions.

Different motives presumably involve differing mixes of brain chemicals, though we don’t know that the amygdala houses the general brain circuitry that undergirds motivation. The emotional learning that predisposes someone to take pleasure in one set of activities rather than another could be the basis of experience.

If such an experience exists, it cannot be answered in a way that would satisfy the strict criteria of scientific objectivism. Experiences are subjective phenomena and therefore cannot be externally verified. Either one trusts the words of the person who reports the experience or one does not. Moreover, whether we are to call a particular experience aesthetic or not ultimately depends on cultural conventions that could change with time and place. Nevertheless, this term experience is an important dimension of human existence.

We will argue that if we expect the aesthetic experience to be a single universal reaction, like the blinking of the eyelid under strong light or the sensation of sweetness at the taste of sugar, then there is no aesthetic experience. But very few human experiences are that simple. Most events in consciousness are built from culturally defined contents as well as from personal meanings developed throughout an individual’s life. Thus two persons can never be expected to have the same experience, and the farther apart in time and place they are, the more the details of the two experiences will differ.

For instance, psychologists have shown that while people who share training in Western artistic traditions will agree in their aesthetic preferences, untutored viewers will not (Anwar and Child 1972; Haritos Fatourous and Child 1977). Sociologists (for example, Bourdieu 1987) have
reminded us that a person can never have a pure, immediate aesthetic experience - whenever we gaze at an object our reaction to it is historically grounded, inseparable from ideologies and social values.

It would be impossible for an Australian aborigine and a New York art critic to have similar reactions to an abstract painting by Jackson Pollock. The objective visual stimuli would be processed in entirely different ways by the two viewers.

2.3.3 Life Without Emotions

People without emotions, as in Antonio Damasio’s study, are often unable to choose between alternatives, especially if each choice appears equally valid. Do you want to come in for your appointment on Monday or Tuesday? Do you want rice or baked potato with your food? Simple choices? Yes, perhaps too simple: there is no rational way to decide. This is where affect is useful. Most of us just decide on something, but if asked why, often we don’t know: “I just felt like it,” one might reply. A decision has to “feel good,” or else it is rejected, and such feeling is an expression of emotion.

We may then add the information provided by research by Antonio and Hanna Damasio (1993). Their theory specifies the relation between analogue “perceptual” representation and “natural language.” One of their important findings is that the natural languages are signifier systems which rely heavily for their semantic components on perceptual and motor modules. The signifier part of a word serves as an activator-component for the perceptual modules, and activation of these and connected association areas provides the semantic component of language. Different categories and meanings are thus located in different parts of the brain. If we say “blue,” the signifier activates the visual cortex and association areas. If we say “coffee
cup” we may evoke visual and tactile representations of its shape, color, texture, and warmth, along with the smell and taste of the coffee, or the path that the hand and the arm take to bring the cup from the table to the lips and motor sensations linked to this movement. All these representations are recreated in separate brain regions, but their reconstruction occurs almost simultaneously. When we see coffee-drinking on the screen, we may therefore mentally simulate taste, heat, and motor sensations, as well as the visual appearance of the cup.

2.3.4 Damasio’s Hypothesis on Emotion

Damasio (1994) has described as a hypothesis the way in which the brain in the right somato-sensory area produces an image of the present state of the body. This is then passed on to pre-frontal regions, which will normally cognitively and affectively assess present or hypothetical situations involving the person. If these brain structures are damaged, a person will be incapable of emotionally evaluating situations and will therefore not be able to act ‘rationally’ either, because of lack of proper motivation. Without the priorities of emotions, the brain does not have guidelines for functioning and for goal-setting.

As a result of his research, Damasio has created a definition of what an emotion is:

“Emotions are complicated collections of chemical and neural responses, forming a pattern: all emotions have some kind of regulatory role to play, leading in one way or another to the creation of circumstances advantageous to the organism exhibiting the phenomenon; emotions are about the life of an organism its body to be precise, and their role to assist the organism in maintaining life.”

Not with standing the reality that learning and culture alter the expression of emotions and give emotions new meanings. Emotions are biologically determined processes, depending on innately set brain devices, laid down by a long evolutionary history.

The devices which produce emotions occupy a fairly restricted ensemble of subcortical
regions, beginning at the level of the brain stem and moving up to the higher brain; the devices are part of a set of structures that both regulate and represent body states.

All the devices can be engaged automatically, without conscious deliberation the considerable amount of individual variation and the fact that culture plays a role in shaping some inducers does not deny the fundamental stereotypicity, automaticity, and regulatory purpose of emotions.

“All emotions use the body as their theater (internal miliey, visceral, vestibular, and musculoskeletal systems) but emotions also affect the mode of operation of numerous brain circuits.” (Damasio 1999)

2.3.5 Neural Structure & Media Reception

Damasio’s conclusion is that our minds are not designed like a computer, to give us a neat printout of the rational arguments for and against a decision in life based on the previous times we’ve faced a similar situation. Instead, the mind weighs the emotional bottom line against those previous experiences and delivers the answer to us in a hunch, a gut feeling.

The ability to read such subjective currents has primordial roots in evolution. The brain areas involved in gut feelings are far more ancient than the thin layers of the neocortex, the centers for rational thought that enfold the very top of the brain. Hunches start much deeper in the brain. They are a function of the emotional centers that ring the brain stem atop the spinal cord–most particularly an almond-shaped structure called the amygdala and its connected neural circuitry. This web of connectivity, sometimes called the extended amygdala, stretches up to the brain’s executive center in the prefrontal lobes, just behind the forehead.

The brain stores different aspects of an experience in different areas–the source of a
memory is encoded in one zone, the sights and sounds and smells in other areas, and so on. The
amygdala is the site where the emotions an experience evokes are stored.

A closer examination of the general features of the nervous system will make the
reception process clearer, and is essential for understanding the relation between cognitions and
emotions. The basic structure of the nervous system is constructed as an input-output machine.
The input is fed into the system through the senses, mainly through the tactile, gustatory, and
olfactory body senses, and through the remote senses of hearing and vision. The output leaves
by the motor-system, that is, by means of the striated muscles which are under voluntary control
from the central nervous system. In primitive animals the connection between input and output is
more or less hardwired: a stimulus of the senses will cause a reflex, a preprogrammed output, as
we know from the knee-jerk reflex and some other stimuli of the body senses.

But in higher animals, and especially in man, the relation between input and output is
much more complicated. This complication is, to a large extent, caused by the potential and the
problems associated with the remote senses, especially vision, and by our advanced cognitive
capabilities. Vision provides a relatively objective representation of the exterior world, which is
only possible if this representation of exterior space and its objects is partly separated from the
interests, preferences of the body, and from reflex-like combination of sensation and subjective
evaluation. Vision is used for a continuous and partly disinterested, but interest driven, mapping
of the environment, which continues for as long as man is awake. The subjective interests now
receive their own representations in the emotions and desires, as represented in the memory, in
the autonomic nervous system, and in part of the hormonal system.
2.3.6 Emotions and Rhythms as Input/Output

Emotions are connected with input-processing. We speak of passion as something which exists in opposition to action: passion expresses heteronomy, dependence either on world input or body-input. And we describe the way in which we become “touched” and “moved” words that describe our perceptions as passive input, not as possible targets for output. From a narrative point of view, this means that, in order to simulate certain emotions and feelings, the input-output processing in the viewer must be delayed or blocked, possibly by identification with the protagonist. Melodrama, for instance, uses a series of devices to block voluntary action, such as simply removing the possible objects (for example, by allowing the beloved to die or disappear) and thus making action impossible. Not only sensations but also memories and images of mental states are characterized by suspension of a motor attitude. This suspension leads to an affective charge of the images and perceptions that I shall call saturation, and which in some respects, corresponds to the feeling-aspect of what Pribram calls reception of fiction and other memorized perceptions which have not been transformed into ‘motor’ tension, and therefore sensation, input-processing, and memory-functions become visible as distinct phenomena. In memories this saturation is a trace of not-enacted excitation that is cut off from its original context of inaction, but that also serves as an emotional marker of future events.

The expression autonomic nervous system indicates that it consists of biological mechanisms that operate without voluntary or cognitive control. However it is mostly the cognitively and voluntarily accessible situations that evoke the autonomic reactions, and thus the strong distinction between emotion and cognition seems to disappear.

Instead of instant motor output, motivational states are produced in order to be subjective
vectors on which the cognitive decision can take place (see Scherer 1994, Damasio 1994). The emotional activations are very closely related to memory because, among other reasons, memory has to provide the perceptions from the remote senses with stored information about previous consequences for body senses of given remote-sense percepts. The emotions evoked by memory motivate future acts and keep the motivation active during possible delays to allow deliberation. The representation of reality-status by feelings is linked to the function of feelings and emotions as advisers for acts.

2.3.7 Emotions as Cognition: Emotional Expression as Bodily Functions

As output-delays, emotions are closely connected with cognition, which is the reverse side of the output-delay; emotions are not irrational forces, but necessary motivators for cognition and the possible resulting actions. Cognition can be seen as a sequence of hypothetical mental test acts. From this point of view, media reception is also a series of mental test acts. Related to delay is the communicative use of emotions as acts which influence the addressee. Expressions of anger and love, for example, may delay physical communication in order to induce a change of behavior. These replace voluntary object-directed motor output, and therefore emotions represent safety-valves as well as permitting subjective excitation coupled with release mechanisms that are independent of stated object relations.

Emotions like anger and rage, which motivate actions, are linked to autonomic reactions which, for instance, increase the blood flow to the muscles, whereas peaceful mental states decrease blood-flow to the muscles and increase it to skin and stomach. In fact, there is a physical and mental cost to such overcontrol. People who stifle their feelings, especially strong negative ones, raise their heart rate, a sign of increased tension. When such emotional
suppression is chronic, it can impair thinking, hamper intellectual performance, and interfere with smooth social interactions.

By contrast, emotional competence implies we have a choice as to how we express our feelings. Such emotional fitness becomes particularly important in a global economy, since the ground rules for emotional expression vary greatly from culture to culture. What is appropriate in one country may appear an unseemly outburst in another. For example, executives from emotionally reserved cultures, like those in northern Europe, can be seen as cold and aloof by Latin American business partners.

2.4 VISUAL PERCEPTION AS RHYTHM

The viewer of visual fiction has only perceptual access to the screen. Nevertheless, cognitive and “subliminal” motor simulations of motor schemata exists as underlying, but suppressed and projected, patterns in the viewing situation, similar to the way in which children learn to read silently, even learning to suppress the movement of their lips.

In a video game, the connection between the screen and the viewer is established both as the visual perception of what is taking place and as a capacity to influence the action by intellectually controlled motor response via the joystick.

Adopting the terminology of the psychologists Bruner and Horowitz (Horowitz 1970: 80), one can call this pattern of signification or meaning enactive, a level of motive meaning, i.e., motor schemata (procedural schemata) which anchor the structuration of the relations of a subject to objects. This enactive meaning is somehow fused with visual and verbal levels of meaning, and is especially connected with meaning’s vectorization, its directedness, the telic, sequential schemata diminishing arousal.
Active control of the world, as modeled in fairy tales and in play, is only one of two basic ways of relating to it. The second way is the passive one. Human beings, and especially small children, are often passively bombarded with aversive or pleasant stimuli without being able to control the situation and react. In the passive position the perceptual and associational activation cannot be transformed into a voluntary enactive response. The only way that a person can ‘control his condition’, the perceptions and excitations he receives passively from without or within, is by motor outlet: by autonomic motor response (shivering, crying, blushing, and so on) in active motor modification of the environment or by mental acts. The common-sense conception of a subject is closely connected with the ability to act, to modify a situation by motor outlet. Nevertheless, many incoming stimuli are beyond enactive control, and will cause interior modifications (for example, fear, and sorrow).

As one professional involved in the arts expressed it:

“Works of art that I personally respond to . . . have behind them a lot of conceptual, political, and intellectual activity . . . The visual representations are really signposts to this beautiful machine that has been constructed, unique on the earth, and is not just a rehashing of visual elements, but is really a new thought machine than an artist through visual means and combining his eyes with his perceptions, has created.” (Csikszentmihalyi, pg 117)

What this person sees in a painting is not just a picture, but a “thought machine” that includes the painter’s emotions, hopes and ideas - as well as the spirit of the culture and the historical period in which he lived. With careful attention, one can discern a similar mental dimension in physically enjoyable activities like athletics, food, or sex.

In New York City most of the streets have no names. Instead, they are distinguished by numbers–Fifth Avenue, Forty-second Street, and so on. Strangers find this method of designating streets extraordinarily difficult to remember at first. We are used to streets with names, which is much easier for us, because each name at once brings up an image of the given
street, and when you hear the street name, this evokes a particular complex of sensations and,
together with them, the image.

Every spectator, in correspondence with his individuality, and in his own way and out of his own experience—out of the womb of his fantasy, out of the warp and weft of his associations, all conditioned by the premises of his character, habits and social appurtenances, creates an image in accordance with the representational guidance suggested by the author, leading him to understanding and experience of the author’s these. This is the same image that was planned and created by the author, but this image is at the same time created also by the spectator himself.

2.4.1 Perception = Pattern = Narrative Structure

The name “narrative”, or its popular equivalent, story, might lead us to understand narrative as something verbal and something connected with speaking “enunciation”. The reason for this is that, until the invention of audiovisual media, language was the prime inter-subjective medium for narrative structures. But, as pointed out by the Russian formalists and by Jakobson (1960), a narrative can be represented in many different ways, such as ballet, opera, film, novel, and cartoon. This is because a narrative structure is a basic mental model that directly relates to the way in which humans make models of the relations between certain types of perceptions, memories, emotions, goals, and acts. These models need not be verbalized: a silent film can be a story by showing protagonists perceiving objects and displaying emotional reactions, possibly followed by physical acts; and, in dreams, visual perception, emotions, and acts will often be linked without any verbalization. Furthermore, these models need not be representations, but functional relations.

Many film theories are implicitly or explicitly normative. It is, however, mandatory that
the fictions are described without interference from the normative criteria of dictating the way in which film the world, or the human subject should ideally be. A theory of visual fiction or film as art should describe all the different types of visual fiction, just as the different structural principles and effects in the viewer should be accounted for and explained. The perceptual, the cognitive, and the emotional, and the temporal as well as the spatial aspects, are a priori equally important aspects of the viewing experience. Many normative discussions of film are implicitly futile discussions about hierarchies of mental functions: some prefer perceptual films; others prefer associative-memory-activating films; yet others like mental problem-solving. Film and television cue mental and bodily states in the viewer by means of representations that have some relation to their experience of a world beyond the media. Although the viewer is accessed by hearing and vision, this does not per se give these senses a privileged role in understanding what visual fiction is about, as they are intimately integrated with other types of experience. The function of perception by remote senses is to provide information analyzed cognitively and evaluated emotionally by means of memory and cognition; and this will be the basis on which possible acts will be planned or executed. Although we receive information by sight or sound, this activates many other mental processes, and it is not really possible to isolate perception from cognition, memory, emotion, and action, and our perception of ‘space’ is not independent of our concept of active motion; our perception of objects is not independent of memories and emotional relations. A given percept or scene, exists as a phenomenon within a complex set of mental processes, and our understanding of reality further depends on complex mental models.

2.4.2 Film Theorists and the Narrative

When one thinks of a video or film, they will most likely recall the two perceptions, both
music and image working together on screen. Film theorists have debated the importance of audio and their level of entwinement, film theorist such as Sergei Eisenstein have rejected a synaesthenesis between music and moving pictures. He instead emphasizes the need to forge associations between music and moving pictures, and emphasized the need to forge associations between the two media with the context of the individual film. But how is this to be done? Eisenstein’s model of music-picture relationships turns out to be similar to the thoughts of the painter Kandinsky. Like Kandinsky’s, Eisenstein’s basic model of cross-media relationships seems to be triadic: picture and music are related not directly, but by virtue of something that they both embody. And at first sight this something is not very different from the inner sound which, for Kandinsky, unified sound and color, but there is one place in The Film Sense where Eisenstein actually talks about the unified inner sounding of a sequence in his film Alexander Nevsky. These terms suggest what might be dubbed the occult nature of music-sound relationships: Eisenstein speaks of a hidden inner synchronization, and those sequential vertical correspondences which relate the music to the shots through an identical motion that lies at the base of the musical as well as the pictorial movement. In Eisenstein’s thinking; it is as if he wants to have it both ways, harping on the occult nature of music-sound relationships but not committing himself to it. It is hardly surprising, then that Eisler accused Eisenstein of obscurantism. His manner of thinking, Eisler complained, is both too narrow and too vague; worse still, it is formalistic.

Puzzling as Eisenstein’s analysis may be, Eisenstein makes it clear in The Film Sense that he thinks of pictorial composition very much along the lines of the classical painterly tradition, one of the aims of which was to guide the viewer’s eye along predetermined routes. The art of plastic composition, he says, “consists in leading the spectator’s attention through the exact path
and with the exact sequence prescribed by the author of the composition.” (Cook, pg 60) Seen this way, the visual composition of a shot or sequence of stills inevitably involves relations of before and after, and if this idea seems unfamiliar today, it is perhaps merely a measure of the extent to which film theory has subordinated principles of visual composition to issues of narrativity. The main point, however, is that Eisenstein goes out of his way to stress that not all film can be analyzed on the exact model of this particular sequence. He is not claiming, then, that there is a general principle that we read pictures from left to right, any more than there are universal synaesthetic correspondences; once again, it is a matter of the individual context—a matter of composition rather than psychology.

The central issue in Eisler’s critique is how far the relationship between picture and music should be, to use Eisler’s terms, one of similarity or one of contrast—what writers on film today generally refer to as parallelism as against counterpoint. In The Film Sense Eisenstein repeatedly refers to the possibility of counterpoint between picture and music, yet Eisler’s principal objection to the practice of film music in general, is its relentless pursuit of parallelism: “Why should the same thing be reproduced by two different media?” Eisler asks. Eisler’s response is, in effect, that one degree isn’t enough. “Such a procedure does not transcend the faulty principle of relating picture and music either by psuedo-identity or by association, it merely transfers the principle to a more abstract level, on which is crudeness and redundant character are less obvious.” (Cook, pg 62) Eisler clearly wants to state a contrary principle—a principle based on what he calls the insurmountable heterogeneity of these media.

This familiar working of music in the narrative cinema illustrates the principle of difference that is lacking in the Eisenstein/Eisler model of film music. The music is not simply more of less similar to the pictures. Instead, the relationship between music and pictures has a
dynamic, processive character, passing from difference at one level to similarity at another; by virtue of jumping the diegetic gap, the music signifies in a manner that is qualitatively different from the pictures, and the issue of parallelism or counterpoint accordingly takes on a quite different aspect.

Mark Johnson (1987) has clearly shown the way in which images directly serve as the basis for establishing a cognitive relation between man and world. The images are not of something else, but a kind of software which establishes and grounds our knowledge in the world. For this very reason, film does not possess a semblance of reality; it is not an illusion, as has been claimed by numerous film scholars and critics; on the contrary, film is part of reality, its experienced power connected to the way in which it cues experiences of central processes in the mind-body-world interaction. From this point of view, narrative structures or schemata are not in principle imposed from without, for instance on images, emotions, or memories, but are related to the synthetic-functional processes by which our different mental faculties and different aspects of the world are connected. This point of view need not conflict with Kant’s (1790) famous definition of art as purposeless purposiveness Zweckmafsigkeit ohne Zweck. Imagination, consisting of hypothetical simulations of possible relations and processes, is a central aspect of everyday life; the difference between art and everyday imagination is not one of kind but of degree, of direct interestedness, and of art understood as superior know-how.

### 2.5 Visual Perception the Circle

The circle is the first organized shape to emerge from the more or less uncontrolled scribbles. A child’s motor and eye control is insufficient to produce shape, but from the child’s viewpoint there is no need for it. As Piaget and Inhelder put it, early shape development is more
topological than geometric, and children aim at general nonmetric properties such as roundness, closed or open, straightness, not at specific, ideal embodiments. Usually these shapes resemble circles sufficiently to make us understand what is intended and are then combined to form human figures, animals, trees while still able to retain their own shapes, for a circle, an oval, four straight lines, properly connected, make a primitive figure. The idea of primacy within the circle and sphere form is of purely perceptual origin and so is the notion that the movement of a body conforms to its shape. Still, the idea remains that the perceptually simplest shape is also naturally the most fundamental one has never been quite abandoned by the human mind.

The image of this simple circular sphere has been used through the ages to depict physical, biological, and philosophical phenomena. Roundness is chosen spontaneously and universally to represent something that has no shape, no definite shape, or all shapes. In this elementary sense, Parmenides represents the wholeness and completeness of the world by a sphere. Thomas Aquinas, compares God, the all-encompassing, with the boundary surface of the sphere, whereas the center point represents the insignificance of the creature. Heavenly bodies, stars and planets, are said to move in circles because the circle is the simplest natural shape and fits the roundness of these bodies themselves. It is here within the perception of the human mind, shape concept formation begins.

The senses of smell and taste are rich in nuances, but in vision and hearing: shapes, colors, movements and sounds are susceptible to definite and highly complex organization within space and time. The perception of shape is the grasping of the structural feature found in, or imposed upon, the stimulus material rarely does this perception conform exactly to the shapes it acquires upon the retina. The full moon is indeed round, to the best of our viewing powers, but most of the things we see as round, are not literally round rather approximations. Nevertheless
the perceived does not only compare objects we see with other round objects but also sees the roundness in them. Our perception consists in fitting the stimulus material within templates of relative shape.

2.5.1 What a Circle Means

The brain does not contain a set of pre-established shapes waiting for stimulus material. Even though there are known responses to certain shapes, colors, or movements, which regulate much instinctual animal behavior. These responses presuppose rather than explain shape perception. If the smallest initiator of the stimulation is not a dot but an object, such as a crawling bug or a moving edge, then a large panel of receptors must cooperate in identifying the stimulus and mobilize all pertinent single nerve fibers. A dot cannot report about an extended object. In other words, even in the eye, long before impulses reach the brain there seem to be responses to shape rather than mere recordings of elements. But these responses to shape do not necessarily imply conscious perception of it. In order to account for the complexity and flexibility of shape perception, it seems that the decisive operations are accomplished by field processes in the brain, which organize the stimulus material on its arrival according to the simplest pattern compatible with it. (Arnheim, pg 28)

The same principle also favors the visual priority of circular shape. A circle is not a line of constant curvature whose points are all equidistant from a center, but first of all a compact, hard stable thing. Shape is so persuasively simple and indivisible to the eye that an ingenious effort was necessary to contradict it in this fashion. The circle’s centric symmetry does not single out any one direction, it is this simple perfection of circular shape which attracts attention. These simple shapes found in the pupils of our eyes are one of the most striking visual phenomena in
nature. A dummy eye on the wing of a butterfly simulates the presence of a strong adversary, and
in reptiles, fish, and birds elaborate camouflage devices hide the revealing disks of the pupils.
The draw of the circle can be seen in experiments by Charlotte Rice which show that young
children often pick the circles from a collection of different shapes even though they have been
asked to look for diamonds. In another experiment, children were presented with a blue square
and a red circle. They were asked whether a red square was more like the square or a circle.
Under such conditions, children up to three years of age chose more often on the basis of shape,
whereas those between three and six selected by color. Children over six were disturbed by the
ambiguity of the task, but more often opted for shape. (Arnheim, pg 175)

Heinz Werner suggested that the reaction of the youngest children is determined by motor
behavior and thus by the “graspable” qualities of the object. Once the visual characteristics have
become dominant, the majority of preschool children are directed by the strong perceptual appeal
of the colors, but as culture begins to train the children in practical skills, which rely on shape
much more heavily than on color, they turn increasingly to shape as the decisive means of
identification. (Arnheim pg. 335)

2.5.2 Perception of the Circle

In order to understand the use of round shapes we must remember that even adults use
circles as representation. Being the most universal, unspecific shape, the circle is an unmarked
or neutral shape, which stands for any shape at all until it is explicitly opposed to other, marked
shapes, such as squares or triangles. In response to their opposition, the circle assumes the
function of designating roundness.

Not only the shape of objects but also that of the intervals between them is dynamic.
that separates objects or parts of objects form one another in sculpture, painting, and architecture is compressed by the objects, and compresses them in turn. These dynamics depends not only upon the size, shape, and proportion of the intervals themselves, but also upon those of the neighboring objects thus creating integral part of what an observer sees.

Both the psychologist and the artist must come to realize that the perceptual experience of looking at a figure cannot be described as the sum of the perceived components. The character of a sphere, for example, resides in its concentric symmetry and the constant curvature of its surface, despite the fact a sphere can be constructed, identified, and commissioned over the telephone by the length of its radius alone. Moreover, simple geometrical figures are a far cry from the intricate kind of pattern we commonly meet in art and nature.

Strictly speaking, all visual appearance owes its existence to brightness and color. The boundaries determining the shape of objects derive from the eyes’ capacity to distinguish between areas of different brightness and color. This is true even for the lines that define shape in drawings; they are visible only when the ink differs in color from the paper. Nevertheless, we can speak of shape and color as separate phenomena. A green disk on a yellow ground is just as circular as a red disk on a blue ground, and a black triangle is as black as a black square. Shape by itself is a better means of identification than color not only because it offers many more kinds of qualitative difference, but also because the distinctive characteristics of shape are much more resistant to environmental variations.

The farther away an object is seen, the more distance determines size, and size determines distance. Objects too far away to reveal their particular outline are perceived as round rather than as any other shape. It is only because an object has a graspable shape in itself can this shape be distinguished from other abstract objects and shapes. At the same time, the range of the
distance gradient as a whole will determine the size value of each location, despite the fact the perceived range does not necessarily equal the objective and physical one. Whether or not the outcome is correct is a question that does not touch the intelligence of the perceptual performance. Distance in depth has no direct equivalent in the two-dimensional projection of the retinal image.

If a perceptual pattern is simply organized and differs clearly from its environment, it has a correspondingly good chance of being easily recognized. These patterns tend to be simple using, distinct colors, shapes, or movements, developed in evolution as signs, on whose clear-cut identity the instinctual responses of animals could be built. Just as physical objects or events are often depicted by abstract properties of shape, so can abstract representations of ideas refer more or less openly to things of nature. Here again there is no dichotomy of mimetic versus non-mimetic representation, but only a continuous scale reaching from the most realistic images to the purest elements of shape and color. Identification, then, presupposes an identifiable pattern. One cannot recognize something as a thing known, expected, or to be reacted to unless it is discriminated by its sharply defined character.

In principle, pattern recognition can be applied to the most complex and crazy shapes, but the simpler the pattern, the easier the task. Chinese ideographs are a greater challenge than the Roman alphabet. Numerals and letters have evolved historically as the results of the search for sets of shapes simple enough to easily produced, perceived, and remembered, yet as clearly distinct from each other as possible. Nature accommodates this need for simple shapes essentially in two ways. They come as signals for organisms endowed with the sense of sight. Quite independently from sight, the tendency towards tension reduction in the physical world will produce the simplest shapes available under the circumstances and thereby assist vision
incidentally. Even so, most of the shapes and combinations of shapes presented to the eye by
nature are much more complicated than letters, numbers, or other signs devised by human vision
for human vision. Drawings can symbolize a state of mind by translating some of its dynamic
properties into visible patterns, and in a similar way musical notation operates partly by means of
symbols; that is, it represents the pitch level of sounds by the structurally analogous location of
the notes on the staff.

The circle although simple and unchanging since its creation as a basic shape, has been
transformed by humanity into an easily recognized pattern. The principles for which the circle
stands for vary from movement to stationary, closed or all encompassing. It is important to note
the circle itself is a neutral object in which all points are located equidistant from the center. The
dynamics of its form come from interpretation when it is compressed in space with other shapes
or used as a means of representation.
CHAPTER 3. METHODOLOGY

The focus of this thesis is to answer the question, “Can rhythm evoke an emotional response?” The answer to this question would demonstrate if rhythm itself can create an emotional experience, and if there are inherent rhythmic properties inherently understood to humanity.

To set forth answering this question it was decided to conduct a survey involving a series of self made videos. This quantitative survey will be used to collect the emotional responses from up to 250 participants per study in two separate studies. Each study would contain five videos each attempting to portray one of the five basic emotions: anger, disgust, fear, joy, sadness.

Following each video would be one multiple choice question. The subject could then rate the video as showing: no emotion, anger, disgust, fear, joy, sadness or something else with a fill in blank option. The five basic emotion choices would have a 0-4 scale alongside them, to which they would then rate how much of each of the emotions appeared in the video. Zero would be “none” and four would be “strong.”

The population sample under subject is all adults eighteen and older. This selection of this target audience is due to their ability to understand instructions and act appropriately in an introspective manner. These subjects should be able to use both the power of observation and their life experiences to interact with the videos and respond accordingly.

The data for this survey was be collected through an online survey created on the website, www.surveymonkey.com. Through the use of word of mouth and flyers, participants were given a link to which they can visit the site and respond to the survey.

At the survey site users were asked to read and agree to a consent form and answer a variety of questions about their personal background including their: sex, age, educational level...
major/degree, and ethnicity. They will then be able to watch the short videos and answer the multiple choice questions. After they have watched all videos and answered the corresponding questions, they will be finished with the survey. There will be no additional contact information required and no follow up questionnaire or survey. (see Appendix A. to view the survey in its final format)

The videos and the survey have all been self created by the researcher. The survey is an adaptation of a previous study discerning emotions that has had proven results. These studies include:

- Philippot (1993) [3-6 minute film studies, French film shown to non-English speaking viewers]
- Gross & Lenson (1995) [16 movie segments to induce basic emotions]
- Goldberg (1951) [2 clips placed back to back to form context]
- Gagnon and Prevetz (2003) [Slow tempi arousal vs. fast tempi]
- Niedenthal & Setterlund (1994) [Music induced emotions]
- Scherer, Banse, Wallbott & Goldbeck (1991) [Recognizing emotions in speech with nonsense]
- Banse & Scherer (1996) [analyzing vocal affect in terms of acoustic parameters]

The videos are created by myself, Aaron Neff, from my own abilities and my own life references. There is no one particular artist or study these videos come from that I know about directly. Each video is a representation of a rhythmic pattern as understood by myself adapted from my own thinking how patterns are understood and natural sources. The videos were reworked repeatedly until they described each of the five basic emotions in pattern form as I understood it. (see Appendix B. for the movie files)

Below are a description of the basic components and concepts relating to the creation of the videos. Each video contains a graphical representations of the patterns as well as keyframe every ten frames.
**Video 1: Survey 1**

This first video of the first survey was designed to display sadness. The smaller circles following a clearly organized downward diagonal directional path to the middle of the frame where they collect together and grow into a larger circle. The circle then descends straight down until it reaches the lower third of the frame where the circle breaks apart into four smaller circles.

The strong downward movements combined with the small brief upwards movement curtailed by another downwards movement seemed sad. The gathering of the small circles into something larger and then dividing them up again, combined with the smaller scale of the circles seemed like a powerful symbolically sad movement.
A small circle appears from off the screen in the top middle left portion of the screen. The circle continues downward in right diagonal direction towards the upper middle.

The circle continues downward but now in less towards the right and more down. The first circle reaches the conclusion of its path and pauses there while the second circle continues almost straight down. The first circle reaches the conclusion of its path and pauses there while the second circle continues down the same path as the first.

The circle again takes the sharp right diagonal direction it did around frame twenty. A second circle enters following the same path as the first.
A third circle enters the frame following the same path as the first two. Each circle is moving at the same speed as the original one.

The fourth circle enters the frame, the duration between the entrance of the circles is being cut in half. Each circle is still following the original.

The fifth circle enters the frame following the same path as the first.

The second circle to enter the frame disappears behind the first one.

The remaining circles continue on their path towards the stationary first one.

As the third circle to enter the frame reaches and disappears behind the first one, the original one begins to grow in size.
As soon as the fourth and fifth circles disappear, the circle ceases to grow and begins a direct decent straight downwards. The larger circle continues its rapid decent down. As the circle reaches the bottom of the frame it disappears into four smaller circles. The smaller circles shoot upwards in a half circle arc. Quickly at first and then slowing just a bit towards the end. The smaller circles disappear rather quickly leaving a white screen.
Video 2: Survey 1

Video two of the first survey was a representation of the emotion fear. It was designed to be a larger circle controlling the path of four smaller circles. Four circles were chosen over three because of the balance they brought to the composition, two for the top and bottom or two for each of the sides. The larger circle dominant because of its size and stroke would begin as an outside force and slowly shrink into frame and push the other circles towards the middle. The circle appears off of frame because it allowed the circle to visually grow in size as it appeared on screen despite the fact it was constantly shrinking in size since the beginning of the movie clip.

The four smaller circles in the middle are merely there to be pushed around by the larger circle, their movement towards the center of the frame is a foreshadowing tool and also to display their range of movement, within the larger circle but no where else. Once the larger circle reaches a size in which it cannot hold all the smaller circles without distorting them they disappear one by one until the large circle reaches the size of the original small circles in which is disappears itself.
1. continuing shrink
2. fast
3. pause
4. fast
5. slowly
6. pause
7. disappear x4
8. stop shrink
9. disappear
The frame appears empty, but after a couple of frames four circles quickly appear each moving towards the center of the frame.

A larger circle appears simultaneously from the edges of the frame. The smaller circles move quicker than the larger one towards the center.

The smaller circles pause as they all reach the middle about the same time. The larger circle continues slowly shrinking.

The small circle continue to remain stationary as the larger circle continues to shrink.

The small circles quickly move towards the edges of the frame.

The smaller circles are stopped by the larger circle which creates a new boundary.
The circles remain attached to the larger circle. The smaller circles are pushed along as the large circle continues to shrink.

The larger circle continues to shrink and the pattern repeats.

The larger circle continues to shrink and the pattern repeats.

As the large circle begins to reach the size of the smaller circles they begin to disappear as there is not enough space for all of them to occupy.

The small circles disappear one by one as the large circle continues to steadily shrink.

Once the large circle reaches the size of the original small circles it to disappears.
Video 3: Survey 1

Video three of the first survey was made to display the emotion of disgust. A large circle in the middle of the frame grows larger in size until it abruptly shrinks into a circle smaller than it started out as. The circle then begins to grow even larger in size until it again abruptly shrinks in size. The third time it repeats this action it expands out of frame and disappears. Four concentric circles appear for a frame and then a static image of multiple circles randomly scattered around appears on screen in sections.

This video is a concept of a pattern repeating three times and then abruptly stopping with an unexpected, random, nonsensical image. An image that would cause a person to sit there and stare, wondering what was going on and if this was all that happened. Disgusted with the random splatter of circles and the absence of closure.
The scene begins with a circle eighty pixels wide and it rapidly grows four and five times its size. The circle continues to grow for about half a second. The growth of the circle is abruptly stopped and reversed as the circle returns to its original size. As the circle reaches that eight pixel diameter it again reverses course and begins expanding again. The circle grows quicker this time at a pace roughly twice as fast as the original. The circle and its stroke both continue to grow to a size that begins to rival that of the frame.
As soon as the circle starts to near the edge of the frame it reverses and shrinks in size again. The circle continues to shrink. Once the circle appears like it is going to shrink into nothing, it quickly expands over the course of a couple of frames, larger than the frame itself. Once the circle expands out of frame it abruptly disappears, multiple circles appear for a frame and a static image starts to form. Groups of the image appear in sections over a couple of frames until the entire collection of circles is complete.
Video 4: Survey 1

Video four of the first survey was designed to show joy through a short clip with a strong upwards arcing movement and rapid radiating multiplication of the circular shape outwards in a circular pattern. The pattern begins at the bottom of the frame with a circle which quickly ascends upwards in an arcing path. The circle then reaches the middle of the top two-thirds of the frame where other circles rapidly appear frame by frame over the original. These circles are each using the same center point as the original, some slightly larger and others more than double the original. This frame by frame animation is being used as an anticipation representation of the shape the smaller circles will be making as they move and complete their paths.

After the circle rapidly multiplies and then disappears, eight smaller circles radiate out and spread out along individual paths until they form a large circular shape. These smaller circles then also multiply in a similar manner as the original and disappear into eight smaller circles. These circles radiate out on their own paths until they also create a larger circular shape. Once the small circles reach the end of their path they disappear and reappear several times over a couple of frames before they disappear for good.
1. normal
2. fast multiply
3. grow fast
4. divide 8
5. spread
6. fast multiply
7. divide 8
8. spread
9. slow disappear
The clip begins with a small circle at the bottom of the frame. In frame #20, the circle begins a rapid ascent upwards in an arcing path towards the top middle section of the frame.

In frame #30, the circle multiplies into several larger circles all with the same exact center as the original circle. All the circles quickly disappear almost as soon as they appeared, separating into eight circles each the same size as the original (frame 10).

In frame #50, those eight circles radiate out on a path that stems directly from the center of the circles that multiplied. In frame #60, as those circles reach the end of their path they too multiply in the same manner as the original circle in frame #30.
Those circles divide into eight equal sized circles each half the size of the original circle in frame ten.

Those circles quickly spread out in a radial pattern along straight line paths.

The circles disappear in and out. Some circles quickly reappear only to disappear again the following frame.

The circles all disappear at random intervals and after a few frames they stop reappearing.

The clip continues with nothing happening for about half a second and then it ends.
**Video 5: Survey 1**

Video five of the first survey is intended to display the emotion of anger. The rapid growth of the three circles, one at a time, unchecked until they grow larger than the frame and disappear was designed to reinforce the concept of rage. The three circles are arranged in an orderly evenly spaced position in the middle of the top two-thirds of the frame. One by one, from the left to the right they each take a turn growing larger and larger over the course of a second or two until they fill the entire frame. Once they fill the frame they disappear and reveal the other circles remaining, which have not moved. At this point the next circle in line repeats the action faster than the previous circle. The action is repeated three times at a quickening pace.

![Diagram of video sequence](image-url)
The clip begins with three stationary circles.

After sitting still for almost two seconds the first circle on the left will begin its movement.

The circle on the left quickly grows in size and stroke as it expands until it is out of the frame.
Once the edges of the expanding circle move out of frame it instantly disappears showing the remaining two circles left still in the same spot.

The remaining two circles continue to not move.

The middle circle, or the circle on the left begins to expand.

This second circle expands rapidly both in stroke and size like the first.

Growing at the same rate as the original the second circle quickly expands out of frame.

Once the second circle has expanded out of frame it quickly vanishes in one frame just like the previous one, leaving the last circle.
The final circle, the original one on the right, sits there for half a second, fifteen frames just like the second circle.

The circle quickly expands just like the previous two circles.

Once the circle expands outside the view of the frame then it also disappears.

There is nothing left and the clip ends a few frames later.
Video 1: Survey 2

The first clip of the second survey was created to display the emotion of fear. This video was originally intended to be much longer, as it was destined to be animated frame by frame. The concept was create a repeating loop of a circle’s path determined by a frame within a frame, but after animating the first fifteen frames and watching the results I determined the video looked more like a circle randomly appearing at locations within the frame, with no determination of movement or direction. This reminded me to much of the ending of video five of the second survey.

At this point I experimented by adding ghost circles, or ghost notes, behind the original circle, I layered these circles over the intended path of the original as if they were a slower set following, being pulled along by the first. The movie clip itself is a circle appearing in a new spot every frame with two additional circles being layered over the original pattern to create the appearance of movement. The movement itself is very angular and creates the illusion of the circle following one triangular path and then switching and following another triangular path, which is an inverted shape of the first. This clip repeats itself five times until it abruptly ends.
fast multiply
very fast
very fast
very fast
very fast
very fast
very fast
repeat all
repeat all
repeat all
This clip begins with multiple circles within the frame. Each circle will be “ghost” circles behind the original darkest circle.

The circles movement is intended to be random repetitive and angular in motion.

The circles that follow the original are intended to describe the patterns direction.

The circle’s do have a boundary, an invisible box which is the same shape as the frame itself. This is the major determination in their path.

The original darkest circle follows short two and three frame paths of movement. The circles that follow are animated frame by frame.

The movement of the circles creates the illusion of upside down two right triangles intersecting one another.
The entire clip itself is made up of the same short pattern repeating itself five times in a row. The proximity of the lighter circles to the darker one is all random. Any order in their placement is due to the clip’s repetition.

The clip abruptly ends after three seconds.

Video 2: Survey 2

This video two of the second survey, was designed to be joyful and to be the exact opposite, concept wise, of video four of the second survey. This clip was made to display strong upward movement, constantly multiplying itself by two, while still keeping all movement mostly limited to the vertical axis. The circle starts off in the middle of the bottom third of the frame where is begins a short descent before abruptly changing movement, in the opposite direction, once it reaches the edge of the frame. The circle quickly travels in a upwards arc slightly towards the left side of the frame before completing the arc in the middle top two-thirds of the frame.
The circle then begins a downwards descent towards the bottom frame where it repeats the upwards arc twice the size of the previous. The upwards movement leads the circle out of the top of the frame, opposed to the lower edge of the frame which contains the circle. After a couple of seconds out of frame the circle returns quickly moving towards the bottom frame, down the center of the frame. The circle then repeats the arcing motion upwards for a third time very rapidly, within a couple of frames, and rockets out of the frame. This time the circle does not return to the frame before the movie clip ends.
The circle begins in the middle and begins a direct descent downwards.

The circle reaches the bottom and begins a rapid curved ascent upwards.

The circle slows a little as it reaches the end of the path and begins to quicken its decent down.

The circle continues traveling downwards, distorting its shape a little as it goes.

The circle hits the bottom of the frame and begins traveling upwards, stretching its shape into an oval.

The circle reaches the top of its second arced ascent upwards. The second upwards movement was roughly twice as high as the original.
<table>
<thead>
<tr>
<th>Frame</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#70</td>
<td>The circle begins another descent downwards</td>
</tr>
<tr>
<td>#80</td>
<td>The circle continues to speed up as it travels downwards</td>
</tr>
<tr>
<td>#90</td>
<td>Once the circles reaches the bottom, it begins a very rapid arcing ascent upwards</td>
</tr>
<tr>
<td>#100</td>
<td>The circle quickly moves out of the top of the frame, disappearing</td>
</tr>
<tr>
<td>#110</td>
<td>The circle continues to remain out of frame</td>
</tr>
<tr>
<td>#120</td>
<td>The circle reappears in the frame moving in a quick downwards decent</td>
</tr>
</tbody>
</table>
The circle reaches the bottom of the frame and quickly zips out of top portion of the frame again.

The circle remains out of frame.

The clip ends before the circle returns.

**Video 3: Survey 2**

Video three of the second survey, was created to show disgust through the twisting and breaking of normal boundaries. This pattern was meant to display nothing in terms of an organized concept like the other videos. Video three was designed to be four separate segments combined only through their downward movement. The shape begins in an oval, a compressed circle, in the center of the screen where it slowly stretches into its regular form of a circle. It begins a quick decent down the middle of the frame until its reaches the bottom two-thirds of the frame where it becomes compressed from its circle form into a straight line. After a brief pause,
four smaller circles grow lengthwise off the flattened circle. Each shape does not start off as a circle but as they grow in size they also become circles. Then each circle breaks off the line, flattened circle, straight down until they are off the frame. The line remains in the frame until the circles are off frame and it also disappears, leaving a few seconds of white until the movie clip ends.
frame #10
The circle begins in the middle of the frame and begins moving downwards. Other than pauses all the movement will be straight downwards

frame #20
The circle stretches into an oval as the top part of the circle remains stationary, while the lower portion begins to move

frame #30
The circle continues to stretch itself an ellipse

frame #40
The entire circle begins to move downwards regaining its former shape of a circle

frame #50
Once the circle has traveled two-thirds of the frame it smashes itself completely flat like a line

frame #60
The line has four new circles grow out of it. Those circles begin to stretch themselves like the original circle
The circles release from the line and begin their decent downwards towards the bottom edge of the frame.

As the circles reach the bottom of the frame they move out of frame and disappear.

Once all the circles move out of the frame the only thing which remains is the line. After a few frames the line also disappears.

**Video 4: Survey 2**

Video four of the second survey was designed to display sadness by constantly dividing the speed and height of the circle in half continuously throughout the entire clip. The idea was to create the concept of a strong downward pull while still allowing horizontal movement. The circle first appears off the left portion of the frame, moving at a fair rate of speed, but instantly starts dropping towards the bottom of the frame. Once the circle reaches the bottom of the frame it only rises up only half of its original height. This trend continues until there is no more height
to divide in half. Once the upwards movement has completely ceased the circle continues to move to the left until it stops. The clip continues for another couple of seconds with the circle sitting there in a stopped state until the end.
The circle appears on the upper left side of the frame and instantly begins an arcing decent towards the bottom of the frame.

The circle continues its decent downwards on a not quite circular but more elliptical path.

The circle’s path is abruptly changed near the bottom of the frame, where it enters a new direction back up.

This new path is circular and after a short trip upwards the circle continues back down.

The circle continues downwards until it reaches a similar position where it changed directions earlier.

The circle is near completing a second smaller circular path.
The circle has completed a second circular path. At the start of each new path the circle is slower than it was on the previous.

The circle begins a third circular path. Each path is half the size of the previous one and take the circle nearly twice as long to complete.

The circle hits bottom again and begins its transition into the fourth and smallest circular path.

The fourth and last circular path barely causes the circle to move upwards. The circle barely reaching the height of its stroke.

The circle is halfway thru the path.

The circle completes the fourth circular path.
The circle enters a straight line path downwards towards the bottom of the frame.

The last path is very slow in nature and will take over a second to complete.

The circle continues its slow movement in a straight line.

The circle continues moving slower and slower.

The circle stops its slow movement and comes to a rest at the bottom of the frame.

The circle continues to remain stationary.
The circle does not move
The circle remains stationary as the clip ends

Video 5: Survey 2

Video five of the second survey was made to represent anger. By creating expanding angles and increased pace, the clip was designed to display the rising intensity found in anger. The pattern was meant to be a simple exponential pattern where the speed of the circle kept doubling each time it reached the edge of the frame and changed direction. The frame was to act as a rigid border which would contain the movements of the circle. As the speed of the movement within the frame increased so did the angle of reflection at which it was rebounding. After a certain speed the angle reached its maximum point and begins to reverse its trend and decrease. This reduction in angle creates the sharp and fast side to side movement at the end of the movie clip.
1. normal
2. faster
3. faster
4. faster
5. repeat x3
6. faster
7. faster
8. repeat
9. disappear
frame #10
The circle begins in the middle of the right side of the frame. It continues downwards at a ~45° until it hits the bottom of the frame here

frame #20
The circle reflects upwards at a ~90° towards the top of the frame. After each contact with the edge of the frame the circle increases in speed

frame #30
The circle continues on its upward path towards the top of the frame

frame #40
The circle reaches the edge of the left side of the frame after traveling at a reflected angle once it reached the top of the frame

frame #50
The circle travels at a downwards ~45° towards the right

frame #60
The circle continues its downwards decent
The circle reached the bottom edge of the frame and rebounds upwards towards the upper right corner.

Upon reaching the top right corner it reflects back downwards at about the same angle it came into the corner at.

The circle continues downwards at a 90° angle, the speed at which it travels continuing to increase.

The circle reaches the top of the frame and bounces downwards. The angle of reflection has widened as the speed increased to about 120°.
frame #130
The circle reflects off the bottom portion of the screen at a wide 150° angle

frame #140
The circle rebounds off the left side of the frame at about a 30° angle, quickening its pace

frame #150
The circle will reach the left side of the frame before it bounces and continues upwards to the top of the frame

frame #160
The circle reflects off the top of the frame at a very wide angle

frame #170
The circle is moving very quickly in a side to side manner downwards

frame #180
Before the circle reaches this position it has already reflected off the right and then left sides of the frame
This is approximately the frame where the circle reaches “terminal” velocity and creates the optical illusion of multiple circles in the frame. The circle wildly bounces and rebounces around the frame. From frame to frame its movement begins literally jumps around seemingly random.

The circle fades as if it is moving too fast for human perception.

The sequence ends with a white screen.

The study was piloted at Iowa State University among two groups. The first being group included six graphic design graduate students in a class being taught by my major professor, Sunghyun Kang. The students took one of two preliminary studies in order to determine what would be the best in terms of results and ease of use. Both surveys had the same questions and video, but the rating systems were different. In one participants were asked simply to checkmark the box containing the word they thought most applied to the video, and in the other they were asked to rate on a (1-5) scale how much each answer applied to the video.
The second pilot study was a rough mock up version of the survey on the actual survey monkey.com website. These participants were two undergraduate students, a graduate student, an Iowa State faculty member, and a statistics academic support staff member who works for the Design department at Iowa State. This group walked through the survey with me, giving direct feedback on the wording, impressions and their own understanding of the steps. These participants did not complete the survey, but rather acted as a focus group to analyze and improve the survey.

The time frame for the collection of data was October 4, 2009 until a sufficient number of participants was reached, one-hundred and forty-five (seventy-four for the first survey and seventy-one for the second) and the survey was closed on March 31, 2010.

Permission for this survey came from the IRB research committee. The IRB is a committee that reviews all research at Iowa State University (ISU) involving human participants, including proposals to gather data from participants for theses, dissertations, and other student projects. (see Appendix C. for the IRB forms and details)

Prior to implementation, all research involving human participants at ISU must receive IRB approval in accordance with federal regulations set forth by the Department of Health and Human Services and the Food and Drug Administration. The IRB also reviews cases of noncompliance, provides policy input, and promotes ethical research throughout the University.

The purpose of the ISU IRB is to ensure that the rights and safety of human participants in research are protected. To achieve this, the IRB advises investigators in designing research projects that minimize potential harm to participants, reviews all planned research involving human participants prior to initiation of the research, approves research that meets established criteria for protection of human participants, and monitors approved research to ascertain that
participants are being protected.

The IRB responsibility for protection of participants is shared with research investigators and the federal government. However, primary responsibility for assuring that the rights and welfare of the individuals involved in research are protected continues to rest with the principal investigator. Also, faculty who assign or supervise research conducted by students or staff have an obligation to consider carefully whether those individuals are qualified to adequately safeguard the rights and welfare of participants.

All of ISU’s human participant research activities and all activities of the Institutional Review Board designated under the Federal Wide Assurance will be guided by the ethical principles in The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research or other appropriate ethical standards recognized by federal departments and agencies that have adopted the Federal Policy for the Protection of Human Subjects.

A requirement of the IRB protocol is to inform them of their rights as a subject and tell them this is a strictly voluntary study, which is completely confidential, with no repercussions that they may quit at any time. This is all outlined in a consent form the subject must agree to before answering any questions regarding the survey.

The data will be imported into Excel or SPSS and the resulting data will be analyzed for commonalities among their responses and separated into categories based upon gender, age, educational level, major/degree and ethnicity to see for correlations. (see Appendix D. for data)
CHAPTER 4. RESULTS

There are millions of patterns and variations found throughout the world, both man made and found. Each one of these patterns means something to us, but that meaning is not always the same to each individual. What is the same in each one of these patterns is the principles that make up the pattern, their frequency, position and directionality. This thesis focused on those principles that make up patterns and how this relates to our emotional response to them.

The primary objective of this thesis was to create a foundation of research to determine if select emotional responses could be triggered by the use of simple repetitive patterns. Repetition is considered one of the basic design principles and its use in design is well known. The question was whether or not a basic pattern, can alone evoke one of the five basic emotions as a response.

This thought originally occurred to me while watching the movement of trains through out the campus during my first year of graduate college at Iowa State. The train tracks ran through campus close to my dorm room. My bedroom window itself faced the tracks and the resulting noise echoing across the parking lot woke me up repeatedly at random intervals during the night.

My first graduate project was designed to help me understand why the trains ran such a tight monotonous schedule and what the shape of the train cars meant in relation to what it could carry. Studying the train cars as they passed by resulted in the creation of messages through their shape, texture, and numbers written on the side of each car. Through some research I came to discover that by analyzing a train’s location, the numbers on the rail cars and the type of cars the trains were pulling, could tell you where they were from what they were carrying, where they were going, and even where the train cars were made. If breaking down a train’s pattern could result in this much information then could any pattern carry a message?
Patterns and emotions are two subjects that musicians and psychologists have been studying for centuries. Musicians can create emotional responses by using various rhythms and tempos. Through the use of particular beats, musicians can encourage dancing, sadness, romance or any other emotional response they so choose. These responses to music have been tested by psychologists in studies involving tone, successive notes and harmony to see how each note or song affects a person’s emotional experience.

Psychologists have also conducted studies which analyzed patterns in images, the juxtaposition of film clips and how facial expressions are universal. These studies prove that people can recognize emotions without knowing the overall context. Psychologists have proven there are visual clues within humanity and that these clues can be determined from either static images or through videos. Underlying these studies is the idea that there is something recognizable that triggers an emotional response, either a shape, action or a pattern.

This study attempted to use patterns within a digital video medium as visual cues to help us respond in a particular way. The survey began with the creation of ten videos, two for each of the five basic emotions, anger, disgust, fear, joy, and sadness. Each video was made under several constraints including the lack of color, the omission of variance in shape, and the principles of repetition. The videos were displayed on the world wide web and participants watched each video clip separately. After the participants watched the video they were asked if the video contained any emotion. If they selected “no emotion” they were asked to proceed to the next video, and if they said there was an emotion present in the video, they were asked to rate how strongly they felt each of the five basic emotions on a zero to four scale. (zero being none and four being strong.)

Participants were allowed to mark multiple emotional levels in multiple categories, and
were also allowed to write in their own emotions. They did not have to rate their emotional responses on the zero to four scale if they wrote in the answer. For example a participant could respond to the video by marking:

<table>
<thead>
<tr>
<th></th>
<th>0 (none)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 (strong)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger</td>
<td></td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Disgust</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Fear</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Joy</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Sadness</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

if “something else” (please specify) MELANCHOLY

The survey link was emailed to friends, posted on boards on campus, and spread through word of mouth until a sufficient number of results were collected. The collection process took place over a three month period from 12/02/09 until 3/11/10. The target audience was anyone over the age of eighteen who had access and could use a computer to view the videos and answer the questions. There were no restrictions besides age, and those under eighteen were excluded because additional permissions would have to be granted by the IRB review board. The ideal survey would have two-hundred participants for each part of the study with equal subject participation across all the demographics, gender, education level and age.

The final response rate collected for the two surveys were seventy-four completed for the first survey and seventy-one completed for the second survey. The first survey comprised of forty males and thirty-four females and the second survey had thirty-four males and thirty-seven females. There were an additional dozen participants for each survey that “quit” once they reached the section where they were asked to rate their emotional responses to the videos.
Additionally people emailed asking how to view the videos, why the videos were not working and what format they were. They were told that these were Quicktime videos meant to be displayed through Internet Explorer or Firefox, and that they could download the Quicktime player if they wished at the Quicktime website. If their computers did not have the updated version of the program this could be the reason for the videos not displaying. No one sent any additional emails with any continued difficulties, and I have omitted any survey left incomplete after personal information section was completed but failed to respond to the videos. It has been assumed that these surveys were filled out by those who could not get the videos to display. Those participants either had to restart the survey because the videos would not play and either quit the survey or restarted the survey once they had installed or updated their computers to play Quicktime files.

The data was into Excel and SPSS where the data was analyzed for commonalities in the responses among the categories based upon gender, age, educational level, major/degree and ethnicity. The results were sorted into a frequency table where the mean, median and mode were derived along with a standard deviation. The frequency tables were then sorted into bar graphs and a bell curve was established. The data was also cross-tabbed and chi-square tests were performed. Those results have been studied and the following conclusions have been inferred.

The first and most important conclusion is the fact that people did respond to the videos with an emotional response, with a majority of the videos carrying a response rate of emotional responses outnumbering those choosing no emotion as their response. Within those emotional responses to the videos there were several patterns that created a consistent response. The response rate to these videos in some cases were four times above the odds of selecting that emotion by chance.
These videos, video 4 in the first survey and videos 2, 3 and 4 in the second survey. In these videos the similar responses always marked in either the joy and the sadness categories. In three of the four videos the overall response was as intended, but in video 3 of the second survey, the intended response was “disgust” but the majority chose sadness. The videos made to represent the emotions of joy and sadness and receiving the intended answers were successful but bring a forth a second point.

The second conclusion was brought forth by the fact there was no strong majority of answers in the categories of fear and disgust, in terms of similarity in responses to a single pattern. The selection of “strong” emotional responses, the marking of a four in a category, to some of the videos raises some suspicions that some people really identified with a particular video. This lack of continued similar responses to videos showing the emotions of fear and disgust is not necessarily proof these basic emotions can not be described by patterns of shapes, but rather shows a need for further refinement in the breakup of what distinguishes one pattern from another. This lack of conformity among answers could also be described by the lack of similarities found between what people are afraid of and what they find disgusting.

For the third conclusion while comparing the demographics of the subjects who participated in this study, there were seventy-one women and seventy-four men who took the surveys. In general both genders responded in similar manners to each video. By adding up the total number of marks each gender made in all the emotional categories we come to the conclusion of 321 emotional marks for the women and 107 no emotion marks, and for the men 342 emotional marks and 157 no emotion marks. Overall it can be said that men marked “no emotion” at a higher rate than women, and at the same time when they did feel an emotion they were more likely to mark in multiple categories. The women did seem to write in more answers
than the men, at a rate of fifty-six write in answers to thirty-two but in terms of the basic emotions, there were comparable numbers between the two genders. A larger pool of answers might help determine a more satisfying discrepancy between the two genders.

The same conclusion might be drawn when comparing education levels and age. Due to the limited pool of responses several categories such as doctorate degrees, four male respondents, and the age group thirty-six to forty-five, thirteen participants. The results are too few to draw an accurate conclusion from, but suspicions lie within the idea that the differences between the groups will be smaller than those along gender lines.

The primary objective of this thesis was to create a foundation to determine if select emotional responses could be triggered by the use of simple repetitive patterns. The question I had asked myself is how do the properties of repetition change when they are applied in motion, and how do they affect the emotional outcome?

During the creation and running of the survey there were several hurdles and obstacles there were encountered. The first problem was the uniqueness of the study and the lack of a foundation in how to proceed with the creation of the patterns. My definition of repetition in the sense of how it creates patterns involving emotions and intonation over time came from literature on music, and my backgrounds in both animation and digital media as well as graphic design. Combining both disciplines helped with the translation of rhythm from audio to visual, from static to filmic, but after seeing the data how people reacted to the videos, there seems to be even more variance in rhythm not yet described in the videos or literature review.

The properties of rhythm displayed in the videos was significant in relation to the emotional responses by the viewer, but in some cases the responses were not the pattern’s original intent, and looking back at the videos there seem to be other rhythmic principles outside
those I originally described which people are responding to. This resulted in some patterns holding
more emotional context that others, and these patterns could now be further defined to further
separating the properties of rhythm. This new understanding was the intended goal of this study,
and is not necessarily a problem refers but these factors led to the realization of new properties
not defined by the definition of rhythm set forth in the literature review which was used to create
the videos in the first place.

The second problem noticed during the survey was caused by the site which hosted the
survey, surveymonkey.com. The site did not have a feature that allowed it to host videos, so in
order to host my videos I had to use my Iowa State web space to host the videos and provide a
link to which users could click to watch my videos on another window or tab, and then flip back
to survey monkey to answer the questions. This switching was something I had to explain to
people who were interested in taking my survey but were unfamiliar with this concept while
surfing the web. This switching was therefore a part of this survey and the transition between
tabs or windows caused a period of reflection, if unintentional. There is the possibility that a
survey with the video and questions in the same window might have yielded different results.

The final problem was the limited number of participants that completed the survey. It
was anticipated that there would be somewhere near two-hundred responses to each survey,
but what was unforeseen was number of people chose to ignore the survey or decided to do the
survey later and never did. There were approximately over three hundred people contacted in
regards of completing the survey but as the data shows, only one-hundred and forty-five people
did. The problem lies within the fact that if more people had been contacted until the survey
reached its maximum number of anticipated responses then there would more data to work with
and larger conclusions to draw from that data.
The following is an artist statement of each individual video, literally describing the video as it unfolded on screen and some of the more detailed numbers in terms of the responses from the participants and how those numbers relate back to the video’s intentions.

The first video, first survey, was created to display the emotion of sadness. The downward trend of small circles collecting and growing, pausing before a final decent to the bottom was suppose to trigger a downward growing sadness, and when the circle reached the bottom of the screen it was suppose to halt its decent and break apart back into those original small circles.

The results said that forty-four out of the seventy-four participants felt no emotion to the video itself. Of the thirty responses that said there was an emotion present in the first video, fourteen of them marked joy and their highest emotional response, with only eleven marking the intended sadness as their highest emotional response to the video. Two people marked fear as their highest emotional response and the three write in emotions included: surprise, contentment, and rain drops. Although this video does have some emotional responses to it, there does not seem to be enough responses to define the video as being specifically containing “sadness” or “joy.”

![Figure 1. Results: Did video one contain emotion?](image-url)
Figure 2. Results: To what degree did video one contain anger?

Figure 3. Results: To what degree did video one contain disgust?

Figure 4. Results: To what degree did video one contain fear?
The second video, first survey, was created to display the emotion of fear. The large circle that enters the scene is serving as a boundary, constricting the movement of the other circles within the scene. As the large circle continues to enter the scene one realizes it is shrinking in size continuing to hinder any movement until the circle reaches the size of those original circles and has consumed each one of those original circles in the middle, one by one. The use of these strong dynamics, the large striking circle seemingly overpowering the smaller circles until there was nothing left on screen.
The results said that forty-two out of the seventy-four participants felt not emotional response to the video. Of the thirty-two responses that said there was an emotion in the second video, sixteen marked fear as their highest emotion, twenty-three people total marked fear in some capacity. A total of eight people marked the emotion of joy as being present in the video, and of those eight, five of those marked that as their highest emotional response. With half of the people who felt an emotion choosing fear, there seems to be some factor of a pattern representing fear within this video, but with an overwhelming majority not seeing any emotion at all within this video the final result of this video is “no emotion.”

Figure 7. Results: Did video two contain emotion?

Figure 8. Results: To what degree did video two contain anger?
Figure 9. Results: To what degree did video two contain disgust?

Figure 10. Results: To what degree did video two contain fear?

Figure 11. Results: To what degree did video two contain joy?
The third video, first survey, was created to display the emotion of disgust. The circle in the center of the scene continued growing slightly larger while shrinking slightly in a repetitive manner. Once the circle reached a terminal size the pattern is broken and substituted for a mass of circles scattered all over the scene. The breaking of continuity combined with the substitution of something random and quite possibly unappealing was the intended result in this video.

The results showed there was definitely an emotion present in this video because only eighteen of the seventy-four participants selected no emotion. Of the fifty-six who did say there was an emotion present twenty-eight people marked “joy” as their highest emotional response. The next highest emotion selected was a tie between anger and disgust, with six people marked each choice as their highest response. With 38% of the respondents choosing joy as their emotional response, it is easy to say the number of people who marked joy outnumbered those who felt disgust.

Looking back and re-analyzing the video, it seems to contain a circle that expands in an expectant manner as if begging to be a countdown..3.2.1...boom. The use of substitution at the end was not surprise, but possibly a payoff to the anticipation the viewer was feeling. The

![Figure 12. Results: To what degree did video two contain sadness?](image-url)
seemingly random pattern thrown up on the screen might equate more or less to confetti being thrown.
Figure 16. Results: To what degree did video three contain fear?

Figure 17. Results: To what degree did video three contain joy?

Figure 18. Results: To what degree did video three contain sadness?
The fourth video, first survey, was made to relate the emotion of joy. The curving upward movement of the circle into a rapid substitution for a large circle that subsequently bursts into eight equal sized circles each half the size of the original splitting out into a uniformed radiant pattern and then at regular intervals dividing again seemed pleasant with a mild organized surprise. The pattern had a light quick whimsical feel to it, there were no real pauses, it had a well paced flow and an identifiable ending.

The results showed that “joy” was indeed present in the video. Of the fifty-nine people who said there was an emotion present fifty of them marked “joy.” Every one of those fifty respondents also marked joy as their highest emotional response. In addition to those who marked “joy” there were five people who had written in answers, these people wrote in choices such as “fireworks”, “excitement”, and “cheerful.” If these answers are counted as things that bring joy or synonyms for the word itself then, then 74% responses were of joy.

Figure 19. Results: Did video four contain emotion?
Figure 20. Results: To what degree did video four contain anger?

Figure 21. Results: To what degree did video four contain disgust?

Figure 22. Results: To what degree did video four contain fear?
The fifth and final video in the first survey was made to display anger. The three circles centered about two-thirds the way up the stage were meant to seem as a building up to something. The circles were to expand as they came at the viewer one by one. Each one of these circles was designed to come at the viewer in quickening intervals. The quickening pace and the repeated in your face repetition seemed like an angering pattern.

The results on this video were split through and through. Thirty-eight of the participants said there was some emotion present and thirty-six respondents said there was no emotion.
present and thirty-six respondents said there was no emotion present. Of those who selected an emotion Nineteen marked some level of fear, with twelve of those being their highest emotional selection, and fifteen marked in the anger category with seven of those being the highest.

![Figure 25. Results: Did video five contain emotion?](image)

![Figure 26. Results: To what degree did video five contain anger?](image)
Figure 27. Results: To what degree did video five contain disgust?

Figure 28. Results: To what degree did video five contain fear?

Figure 29. Results: To what degree did video five contain joy?
The first video of the second survey was supposed to display fear. The short fast pattern repeated every three steps with a secondary pattern repeating in close proximity to double the emphasis of the pattern being constrained to an invisible box within the frame. This short loop really identified a trapped pattern to myself, unable to break free.

The results showed that forty-one out of the seventy-one participants in the second survey did feel some sort of emotion, and of those forty-one who marked an emotion, twelve of them marked joy as the highest emotion experienced. The interesting fact for this video is that seventeen people marked in the fear category, while only eighteen marked in the joy category overall. The difference would be that of those seventeen eight marked fear as their highest choice. The other interesting note is the fact that of the forty-one who had an emotional response, seventeen of them choose to use only the write in response. This will be the highest total number of write in answers for any of the videos and prove to be the only marked difference in male and female responses. In total there would be six write in answers for the men, four were write in only. The men wrote in answers such as: excitement three times, manic, confusion and strife. The female participants had seventeen write in responses, thirteen were write in only. The
female group wrote in answers such as: confusion four times, anxiety thrice, excitement twice, annoyed, disorientation, intrigue, jittery, fun, nervousness, and nostalgia. These results seem to show that women were confident something more than a “basic emotion” was present in this video, and that some viewers were uncomfortable with the video. Evident by the high number of “negative” answers including confusion, anxiety, annoyed, disorientation and nervousness.

![Figure 31. Results: Did video one contain emotion?](image)

![Figure 32. Results: To what degree did video one contain anger?](image)
Figure 33. Results: To what degree did video one contain disgust?

Figure 34. Results: To what degree did video one contain fear?

Figure 35. Results: To what degree did video one contain joy?
The second video, second survey, was made to convey the emotion of joy. A circle was placed in the center of the stage and repeated a jumping motion several times. Each time the ball rose higher until eventually leaving the confines of the screens and on each return to the stage the ball moved quicker and quicker. The rising action and the quickening pace, were meant to be fun and non threatening.

Of the fifty-seven people who experienced an emotion present in the video, forty-four of them selected joy as their highest emotion. This video seemed to contain the same responses as the fourth video in the first survey. Both videos were quick moving, upward leading, with slightly curved paths. The differences between the videos was be the absence of the segmentation of the pattern as it radiated into another circle and then repeated, as in the 4th video. Rather this video made use of a strong counter movement in a downward motion.
Figure 37. Results: Did video two contain emotion?

Figure 38. Results: To what degree did video two contain anger?

Figure 39. Results: To what degree did video two contain disgust?
Figure 40. Results: To what degree did video two contain fear?

Figure 41. Results: To what degree did video two contain joy?

Figure 42. Results: To what degree did video two contain sadness?
The third video in the second survey was made to portray disgust. The slow downward pull of the large circle until it collapses into a line, pauses, and segments into four smaller circles who finish the path downwards. The slow pace of the shape with the segmentation of the circle was designed to achieve a slow contaminating spread feel.

Of the fifty-two people who selected some sort of emotional response to this video, thirty-five people marked sadness as the highest emotion. Of those thirty-eight people in total who marked some degree of sadness in the video, ten of those gave the video a “4 (strong).” This eighth video had the most “strong” emotional responses. Despite sadness being selected as the strongest emotion felt, there were numerous other participants who also marked in other emotional categories in addition to sadness, signifying they felt multiple emotional responses. This could be a factor of two patterns competing against one another or a link back to what psychologists were talking about when the theory that basic emotions are combined to make more complex emotions.

![Figure 43. Results: Did video three contain emotion?](image)
Figure 44. Results: To what degree did video three contain anger?

Figure 45. Results: To what degree did video three contain disgust?

Figure 46. Results: To what degree did video three contain fear?
The fourth video, second survey, was made to exhibit sadness. This message was created by making a video that “weakened” the longer it remained on stage. By reducing the dynamics of how high the circle was rising after each time it hit the bottom of the stage there was the portrayal of losing momentum. This in combination with the shortening of time between each movement of the circle until eventually pausing the circle on the stage made the circle seem to lose energy during the duration of the video.

Although this video had ten more “no emotion” answers, twenty-nine in all, than the
video shown before it there were very similar numbers in the actual sadness category.

Thirty-three people selected sadness as their highest emotional response, but overall there were less threes and fours selected in this video, than the one before it. It can be said that this video did not have the strong responses as video 3 before it, but also did not contain the mixed responses in the other emotional categories as well.

Figure 49. Results: Did video four contain emotion?

Figure 50. Results: To what degree did video four contain anger?
Figure 51. Results: To what degree did video four contain disgust?

Figure 52. Results: To what degree did video four contain fear?

Figure 53. Results: To what degree did video four contain joy?
In the last video, the original intent of this video was anger. This was designed to be a very simple video using only the dynamic of increasing speed of the circle as it hit the sides of the stage. The results of this process led to an unintentional secondary variation of rhythm, ornamentation. Going through the video frame by frame shows one circle per frame, but when the video is shown at real speed, the viewer sees “ghost circles” or multiple circles on the screen at once. This led me to the conclusion that video would contain the fastest speed as which a single object can travel before it enters the next level, the illusion of speed, which requires multiple objects to create movement.

The results of this video are more or less a grab bag of emotions. Eighteen people did select anger as their highest emotional response, fifteen people selected no emotional response, and thirteen people wrote in their own answer. The only emotion that was not selected in this video was sadness, the best conclusion for this video might be one of the write in answers, chaos.
Figure 55. Results: Did video five contain emotion?

Figure 56. Results: To what degree did video five contain anger?

Figure 57. Results: To what degree did video five contain disgust?
Figure 58. Results: To what degree did video five contain fear?

Figure 59. Results: To what degree did video five contain joy?

Figure 60. Results: To what degree did video five contain sadness?
CHAPTER 5. CONCLUSION

This study set out to determine whether or not a circle following a pattern of actions could evoke a basic emotional response. Whether a conscious emotion instilled with in the pattern by the artist, Aaron Neff, could evoke the same emotion in the audience when they viewed the video. The questionnaire was designed to determine the number of emotional responses to each particular basic emotion and the strength of those responses. Were those responses consistently for the same basic emotion and were those responses in line to what emotions the artist was trying to invoke during the video’s creation. In this investigation, the original aim was to assess whether or not the movement of an object in a distinct pattern could relate an emotion without any normal image associations.

The purpose of the study was to determine if there were factors within patterns that could be used in association with emotions. Were these factors in patterns simply directional based or could they be tied to frequency, duration, and consistency. The project was undertaken to design different patterns using a variety of variables, each interchangeable with one another, to create a rhythm, understood and interpreted by the audience. The results could then determine a basis of knowledge upon which future concepts, designs, patterns, projects and research could begin.

Returning to the hypothesis posed at the beginning of this study, it is now possible to state that the simple shape of a circle can be repeated in various patterns of movement, by varying the speed and location, to create basic emotional responses. These responses to the video can be recorded in a measurable and consistent manner as to prove the responses are accurate at a beyond chance percentage, but more data will need to be collected to prove whether there is some measurable difference in the emotional responses between the sexes, age groups, education levels and cultures.
This study has shown that six out of the ten video clips shown had an emotional response rate seventy percent and above, videos three and four of the first survey and videos one, two, three and five of the second survey. Of these six videos three of them had definite correlations between a particular emotional response, video four of the first survey, videos two and three of the second survey.

In total there were 725 responses to the question, “Is there an emotion present in this video?” Of those responses 472 of them said, “Yes, there is an emotion.” This finding proves that in general people had an emotional response to the videos. The second survey had more emotional responses than the first. The first had 216 responses out of 370 marked as emotional responses, and the second 256 out of 355. The important fact is that overall people responded emotionally more often than not, with two out of every three answers selecting yes.

The emotional responses were only consistently marked for the same basic emotion in three of those videos. Fifty participants, out of seventy-four marked joy in video four of the first survey. Thirty-eight out of seventy-one chose joy in the second video of the second survey. And thirty-eight out of seventy-one marked sadness in the third video of the second survey. These are the only videos in this survey that contained a consistent recordable basic emotional response.

In this survey it was also shown that videos three of the first survey and videos one and five of the second survey had seventy-seven percent of the total number of responses being emotional but no majority weighted towards a particular emotion. These videos contain strong emotional responses just not consistently for the same basic emotion. The emotional responses over multiple basic emotions could be thought of much like the theory that basic emotions combine to form complex emotions.

A look at the average response for each emotion can be noted by taking the putting
weight to each answer given. A no emotion answer or a zero in the corresponding category would count for nothing. If the category had a four for “strong” marked in it then the weighted answer would be four. By adding these marks together and dividing by the total number of responses for that video one can calculate the average score each emotion received.
Average Value of Response

**Figure 63. Scaled Data for Survey 1 Video 3**
Weighted Responses Over Total Number of Responses

- anger: 0.27
- disgust: 0.22
- fear: 0.30
- joy: 0.99
- sadness: 0.07

- a strong response (4) = 4 pts
- no emotion response = 0 pts

**Figure 64. Scaled Data for Survey 1 Video 4**
Weighted Responses Over Total Number of Responses

- anger: 0.08
- disgust: 0.04
- fear: 0.07
- joy: 1.91
- sadness: 0.08

- a strong response (4) = 4 pts
- no emotion response = 0 pts
Figure 65. Scaled Data for Survey 1 Video 5
Weighted Responses Over Total Number of Responses

Figure 66. Scaled Data for Survey 2 Video 1
Weighted Responses Over Total Number of Responses

a strong response (4) = 4 pts
no emotion response = 0 pts
Figure 67. Scaled Data for Survey 2 Video 2
Weighted Responses Over Total Number of Responses

Figure 68. Scaled Data for Survey 2 Video 3
Weighted Responses Over Total Number of Responses

a strong response (4) = 4 pts
no emotion response = 0 pts
Figure 69. Scaled Data for Survey 2 Video 4
Weighted Responses Over Total Number of Responses

Figure 70. Scaled Data for Survey 2 Video 5
Weighted Responses Over Total Number of Responses

- a strong response (4) = 4 pts
- no emotion response = 0 pts
The general conclusion found by this study is that people have emotional responses to the visual patterns they see on the screen, and that these responses to a video can sometimes be predetermined by the artist. Regardless of whether or not these responses are the intended choice by the artist, these emotional responses can be consistent or vary over multiple categories. This conclusion is supported by the total number of emotional responses within the findings and by adding the strength of the responses by each individual together. These factors find it is possible use the simple shape of a circle, repeated in various short patterns of movement for an artist or designer to create basic emotional responses.

The second major finding of this study was the determination that these results can be recorded at a conscious level. The responses can be measured to show that the patterns of movement an object takes clearly can have an impact on humanity. During these short clips, each a few seconds in length, participants can watch, react, internalize, understand and respond. Within each of these videos, there is something that signals a particular response repeatedly among individuals.

These findings enhance our understanding of how little it takes for one to respond or understand the emotional qualities of a video with minimum visual information outside of movement. This research will serve as a base for future studies and as a platform for the creation of future motion graphic works by showing humanity just how important the choice of certain movements and actions can be.

The current findings add to a growing body of literature on basic emotional responses to videos and images, and this study has led towards enhancing our understanding of how rhythm can be used to describe an emotion. This method of using rhythm may be applied to other design processes elsewhere beyond motion graphics, and these findings here in this study provide a new
understanding of what it means to view art both moving and static images. This project has created a new pathway in my understanding of art as a whole, art is a rationalization of the emotional conflicts within the designers mind and reflect their level of understanding of how viewers will perceive their work.

Everyone flows through their days in daily patterns and cycles, they are constantly digesting the patterns within their environment around them, some of these patterns are natural, some man made, and some cultural. These patterns can be simple static images seen only for a moment or can take up one’s entire consciousness.

The present study confirms previous findings and contributes additional evidence that suggests humanity picks up on small hints within movements just like those found in gesture and facial features to make emotional decisions. While this study did not confirm the nature of how much these movements are related to our responses, it did partially substantiate the idea that certain patterns of actions can be linked to certain basic emotions.

Finally, a number of important limitations need to be considered. First, this study only involved one hundred and forty-five people. A strong foundation to start with, but a larger sample of responses needs to be collected to solidify the conclusions found here. The collection of additional responses would also help answer the third hypothesis of my survey, that there are some measurable difference in the emotional responses between the sexes, age groups, education levels and cultures, as this study did not reach enough participants within each demographic to reliably analyze and compare these variables.

The second limitation within this survey lies within the emotional choices found on the questionnaire. Of those responses: anger, disgust, fear, joy and sadness, only one of them can be considered a positive emotion, joy. During the creation of the videos and survey it seemed
natural to follow along those lines psychologist defined as the beginning of emotions. The thought was to test if the videos could create an emotional response, and since most psychologists describe five emotions as being the primary ones to survival the choice was to select these as the basis for creating the videos as well as the answers. Looking back this factor could be thought as a second yes or no question following the original question for each video, did this video contain an emotion. The second question being is this emotion positive (joy) or negative (anger, disgust, fear, sadness.)

Another limitation was the use of the circular shape, although it is the original and most natural shape, it also carries with it heavy context. Due to the perfect nature of its shape the circle could be thought of as correct or rightly defined, which would lead to a more positive association than negative.

The project was limited in several ways. First, the project used a convenience sample that was limited to the number of responses collected within a certain time frame, using a particular media, the internet. These responses were collected within particular educational and known social circles mainly within the United States and with this small sample size, caution must be applied, as the findings might not be transferable to other social circles or cultures.

The most important limitation lies in the fact that this study only tested ten different patterns. These ten videos represent a small sample of the total number of possible patterns and contain importance simply based upon the fact they were selected over other patterns to be displayed in the survey. The current study has only examined the relationship between humanity and these ten videos.

This research has thrown up many questions in need of further investigation, and it is recommended that further research be undertaken in the following areas:
shapes - using alternative simple shapes such as a square or triangle
shapes - using complex shapes or symbols such as letters and numbers
color - the use of color versus the absence of
culture - comparing responses across different cultures

It is suggested that these factors be investigated in future studies with the investigation and experimentation into shape being strongly recommended. As the additional information provided by studies on shape would help to establish a greater degree of much rhythm defines response.

A number of other possible future studies using the same experimental set up are apparent. A continuation of this research would involve a study with more participation by the subjects themselves. The thought would be to create a website or program that allows other artists, designers or anyone that wants to make videos with the same restraints that I have allow myself during this study. The participants could create their own videos that represent an emotion as they understand it. They could then submit their video for analysis by others, within a system similar to this survey. By collecting and analyzing the videos that were successful at evoking a certain emotions there could be a similarity of pattern in which they used rhythm. This understanding of patterns could create a system of designing rhythms beyond the current level of thinking.

Further experimental investigations are needed in medias outside of motion graphics. This process of understanding rhythm could be moved from beyond the field of graphic design over into the process of capturing video. By recording a short scene involving a two character conversation with eight cameras set up in a circle using a variety of close up, mid range and wide range shots you could possible edit different emotional contexts.

By using the footage and editing it at different times and rates could you create different
patterns of viewing and understanding. For example, by holding long far shots on one character
and cutting in short close up shots of the other character’s responses could that create new
context. Another possibility would be starting with far shots and gradually cutting faster and
faster closer and closer to the characters, possibly creating a closer and closer interaction
between the two. These patterns of editing could be thought of in the same manner as the
dynamics of movement created by the circle and rhythm could also lead to a greater
understanding of cinema.

More broadly, research is needed to understand how patterns visual interact and unfold
over time. The system upon which the patterns were created for this survey has been mostly a
musical understanding of patterns. The visual understanding of patterns has not been explored
to the point where a distinction between patterns and movements is defined as discovered within
musical notation.

The findings of this study have a number of important implications for future practice.
First, how the eye is led visually through a piece can be a strong determinant in how you respond
emotionally to a piece. Next, is how sequencing and the duration of images on screen carry with
them special emotional significance. Finally, this means to design that the use of grid and
placement are really not laws of design but a system of setting up and organizing rhythm.
Everyone unconsciously creates rhythm and we can decode those same rhythms without
consciously thinking about it, but during the decoding process the message can change from
artist to viewer.

This project was trying to uncover whether there are shared experiences, emotions, that
can be transferred through the use of basic patterns. These basic patterns, rhythms, are visually
repeated over and over in our shared experience. We constant make art work that includes these
rhythms each and every day and yet we do not always consciously understand the messages we are sending one another.

With this I recommend that the world take further steps in the analysis of rhythms and the messages that can be created from the simplest of rhythms. At the very least there is the possibility for an interesting dynamic that occurs when a designer focuses on the rhythm itself within their work.

In relation to how I will be designing in the future, I will be placing a more important emphasis on a design’s emotional impact. Legibility and usability are very important aspects of design, but the emotional message is what the viewer walks away with, and this project could open a new pathway for the teaching and understanding of the design process as a whole.

This study had only touched the tip of what can be accomplished using rhythms. Somewhere within this study is the makings of a new design process and a new understanding of how to make motion graphics. This is a chance to develop new patterns and methods of making art, particularly but not limited to motion graphics. If shapes can be made into rhythms, then film editing can be made into a rhythm, and anything that has a hierarchy can be edited into a rhythm.

Developing a new understanding of what defines a pattern or a rhythm and how the eye sees and understands this relationship could affect not only how we design motion graphics but also be used in the creation of static images. If art can move an eye through a piece, that creates a rhythm, and as proved here a rhythm can carry with it an emotional context based on each tendency in the rhythm.

This idea of repetition could work its way back into symbol design, font creation, logos, interactivity and interfaces. Making experiences simpler and more intuitive all because of the
emotional significance in rhythms, that could be provided by using patterns as a foundation in a design. By reexamining how images and patterns unfold, within strictly natural, computer generated, or body language and gesture we could create a shirt away from legibility and more towards feel, and eventually create a union of rhythm and human.
REFERENCES


Gibson, James (1950) The Perception of the Visual World Cambridge, Massachusetts


Ortony, A., & Turner, T.J. (1990) What’s basic about basic emotions? Psychological Review, 97, 315-331


APPENDIX A. SURVEY FINAL FORM

1. Survey Entrance

This is a survey conducted by Aaron Neff a graduate student at Iowa State. You will be watching 5 videos of a shape moving around the screen and rating the possible emotion choices. These are short videos, and you may not realize they are already finished. Feel free to watch each video several times if you want and then answer the questions.

Please print out a copy of the informed consent document to keep for your own records. To do so, right click on the form below and click “save picture as” you will then have a jpeg which you can print out a copy of

CONSENT FORM FOR: SENSING RHYTHM, A DESIGN PATTERN FOR EMOTIONS

This form describes a research project. It has information to help you decide whether or not you wish to participate. Research studies include only people who choose to take part - your participation is completely voluntary. Please discuss any questions you have about the study or about this form with the project staff before deciding to participate

Who is conducting this study?

This study is being conducted by Aaron Neff

Why am I invited to participate in this study?

You are being asked to take part in this study because you are a member of the 21st century who is willing to participate in a study involving the internet and video media. You should not participate if you are under age 18.

What is the purpose of this study?

The purpose of this study is [create a set of videos using a variety of rhythms in order to determine and basic patterns for some of humanity’s basic emotions, anger, disgust, fear, joy, sadness. Future designers could they use similar patterns to create more powerful messages in their own work.]

What will I be asked to do?

If you agree to participate, you will be asked to [answer four basic questions about your gender, age, education level, and ethnicity. Then you follow a link to where you will be shown five different videos, each followed by a multiple choice question with seven different options. You will then rate the videos on a 0-4 scale relating to your personal emotional reaction to the video. At no point will you be asked for personal information, recorded or be contacted for follow up information.] Your participation will last for [about fifteen minutes total. The survey should take about two minutes for each video plus the time required to read the consent form and instructions.]

What are the possible risks and benefits of my participation?

Risks - The possible risks related to your participation in this research are [possible discomfort due to the rapid movement of circles across and towards the screen. These might make you close your eyes, become slightly disoriented, or look away. The events in each video will be nothing more than what is encountered in routine television or videos.

Benefits - You may not receive any direct benefit from taking part in this study. We hope that this research will benefit society by [enabling designers in the future to create more meaningful messages and more emotional viewing experience.]
How will the information I provide be used?

The information you provide will be used for the following purposes [The information will be included in a thesis titled: Sening Rhythm, A Design Pattern for Emotions by Aaron Neff at Iowa State University. As well as the chance the results would be future published in articles and or a book.]

What measures will be taken to ensure the confidentiality of the data or to protect my privacy?

Records identifying participants will be kept confidential to the extent allowed by applicable laws and regulations. Records will not be made publicly available. However, federal government regulatory agencies, auditing departments of Iowa State University and the ISU Institutional REview Board (a committee that review and approves research studies with human subjects) may inspect and/or copy your records for quality assurance and analysis.

To ensure confidentiality to the extent allowed by the law, the following measures will be taken [e.g. subjects will be assigned a unique code to identify each individual based only on the information regarding gender, age, education, and ethnicity. (Not your name) If the results are published, your identity will remain confidential

Will I incur any costs from participating or will I be compensated?

You [will not] have any costs from participating in this study, and [will not] be compensated for participating

What are my rights as a human research participant?

Participating in this study is completely voluntary. You may choose not to take part in the study or to stop participating at any time, for any reason, without penalty or negative consequences, and you can skip any questions that you do not wish to answer.

Whom can I call if I have questions or problems?

- For further information about the study contact [Aaron Neff at neff8684@gmail.com or Sunghyun Kang at shrkang@iastate.edu]
- If you have any questions about the right of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, IRB@iastate.edu or Director, (515) 294-3115, Office for REsponsible Research, 1138 Pearson Hall, Iowa State University, Ames, Iowa, 50011.

You have read the above statement and you ______

☐ Agree

☐ Disagree
2. About Yourself

the following information will be used for the survey only

**Gender**

- [ ] Male
- [ ] Female

**Age**

- [ ] 18-25
- [ ] 26-35
- [ ] 36-45
- [ ] 45-60
- [ ] 60+

**Educational Level**

- [ ] Some High School
- [ ] High School Diploma/equivalency
- [ ] Some College
- [ ] Bachelors Degree
- [ ] Masters Degree
- [ ] Doctorate Degree

**Major/Degree**

- [ ]

**Ethnicity (optional)**

- [ ] American
- [ ] Other (please specify)

- [ ]

[Prev] [Next]
This is the first video of five total videos you will be watching. [click here for the first video]
The link will open a short 3-7 second video for you to watch in a new tab. When you are
done watching the video however many times you wish, close the link and return to this
page. Then answer the following questions as they apply.

1a. If the video contained no emotion, check the box and proceed to the next page

   ○ no emotion

1b. If you did not check the box above, rate the following emotions as they apply

<table>
<thead>
<tr>
<th></th>
<th>0 (none)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 (strong)</th>
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</thead>
<tbody>
<tr>
<td>Anger</td>
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<tr>
<td>Disgust</td>
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<td>Fear</td>
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<tr>
<td>Joy</td>
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<tr>
<td>Sadness</td>
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</table>

if “something else” (please specify)
APPENDIX B. SURVEY MOVIES

Video 1: Survey 1
Running time: 0:06
(click to view)

Video 2: Survey 1
Running time: 0:05
(click to view)
Video 3: Survey 1
Running time: 0:04
(click to view)

Video 4: Survey 1
Running time: 0:03
(click to view)
Video 5: Survey 1
Running time: 0:05
(click to view)

Video 1: Survey 2
Running time: 0:03
(click to view)
Video 2: Survey 2
Running time: 0:05
(click to view)

Video 3: Survey 2
Running time: 0:05
(click to view)
Video 4: Survey 2
Running time: 0:06
(click to view)

Video 5: Survey 2
Running time: 0:07
(click to view)
APPENDIX C. IRB FORMS

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

DATE: November 30, 2009

TO: Aaron Neff
815 Forest Ave.
Belleville, IL 62220

CC: Sunghyun Kang
282 Design

FROM: Office for Responsible Research

TITLE: Sensing Rhythm, A Design Pattern for Emotions

IRB ID: 09-489

Approval Date: 30 November 2009
Date for Continuing Review: 29 November 2010

Submission Type: New
Review Type: Expedited

The project referenced above has received approval from the Institutional Review Board (IRB) at Iowa State University. Please refer to the IRB ID number shown above in all correspondence regarding this study.

Your study has been approved according to the dates shown above. To ensure compliance with federal regulations (45 CFR 46 & 21 CFR 56), please be sure to:

- Use only the approved study materials in your research, including the recruitment materials and informed consent documents that have the IRB approval stamp.

- Obtain IRB approval prior to implementing any changes to the study by submitting the “Continuing Review and/or Modification” form.

- Immediately inform the IRB of (1) all serious and/or unexpected adverse experiences involving risks to subjects or others; and (2) any other unanticipated problems involving risks to subjects or others.

- Stop all research activity if IRB approval lapses, unless continuation is necessary to prevent harm to research participants. Research activity can resume once IRB approval is reestablished.

- Complete a new continuing review form at least three to four weeks prior to the date for continuing review as noted above to provide sufficient time for the IRB to review and approve continuation of the study. We will send a courtesy reminder as this date approaches.

Research investigators are expected to comply with the principles of the Belmont Report, and state and federal regulations regarding the involvement of humans in research. These documents are located on the Office for Responsible Research website [www.compliance.iastate.edu] or available by calling (515) 294-4566.

Upon completion of the project, please submit a Project Closure Form to the Office for Responsible Research, 1138 Pearson Hall, to officially close the project.

ORR 09/09
**INSTITUTIONAL REVIEW BOARD (IRB)**

**Application for Approval of Research Involving Humans**

**OCT - 5 2009**

**SECTION I: GENERAL INFORMATION**

<table>
<thead>
<tr>
<th>Principal Investigator (PI): Aaron Neff</th>
<th>(618) 979-0528</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degrees: BFA Animation and Digital Media</td>
<td>Correspondence Address: 815 Forest Ave Belleville, Illinois 62220</td>
<td></td>
</tr>
<tr>
<td>Department: Graphic Design</td>
<td>Email Address: <a href="mailto:Nef18684@gmail.com">Nef18684@gmail.com</a></td>
<td></td>
</tr>
<tr>
<td>College: Iowa State</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PI Level: ☑ Faculty ☑ Staff ☐ Postdoctoral ☑ Graduate Student ☐ Undergraduate Student</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternate Contact Person: Cynthia Neff</td>
<td>Email Address: <a href="mailto:fourneffs@actscape.com">fourneffs@actscape.com</a></td>
<td></td>
</tr>
<tr>
<td>Correspondence Address: 815 Forest Ave</td>
<td>Phone: (618) 234-8739</td>
<td></td>
</tr>
<tr>
<td>Belleville, Illinois 62220</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Title of Project:** Sensing Rhythm: A Design Pattern for Emotions

**Project Period (Include Start and End Date):** [mm/dd/yy] [10/10/09] to [mm/dd/yy] [12/31/09]

---

**FOR STUDENT PROJECTS**

<table>
<thead>
<tr>
<th>Name of Major Professor/Supervising Faculty: Sunghyun Kang</th>
<th>Signature of Major Professor/Supervising Faculty: Sunghyun Kang</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone: (515) 294-1669</td>
<td>Campus Address: Office: 282 Design</td>
</tr>
<tr>
<td>Department: Graphic Design</td>
<td>Art and Design Department</td>
</tr>
<tr>
<td>College Address: 158 College of Design</td>
<td></td>
</tr>
<tr>
<td>Ames, IA, 50011</td>
<td></td>
</tr>
<tr>
<td>Email Address: <a href="mailto:shrkang@iastate.edu">shrkang@iastate.edu</a></td>
<td></td>
</tr>
</tbody>
</table>

**Type of Project:** (check all that apply)

☐ Research ☑ Thesis ☐ Dissertation ☐ Class project

☐ Independent Study (490, 590, Honors project) ☐ Other. Please specify: __________

---

**KEY PERSONNEL**

List all members and relevant experience of the project personnel. This information is intended to inform the committee of the training and background related to the specific procedures that each person will perform on the project.

<table>
<thead>
<tr>
<th>NAME &amp; DEGREE(S)</th>
<th>SPECIFIC DUTIES ON PROJECT</th>
<th>TRAINING &amp; EXPERIENCE RELATED TO PROCEDURES PERFORMED, DATE OF TRAINING</th>
</tr>
</thead>
<tbody>
<tr>
<td>☑ Aaron Neff, BFA</td>
<td>P.I./Survey/Data Analysis</td>
<td>03/23/07 2/4/08</td>
</tr>
<tr>
<td>☑ Sunghyun Kang, MA, MFA</td>
<td>Major Professor</td>
<td>08/08/02</td>
</tr>
</tbody>
</table>

Office for Responsible Research/IRB 05/05/09
FUNDING INFORMATION

- Internally funded, please provide account number:
- Externally funded, please provide funding source and account number:
- Funding is pending, please provide OSPA Record ID on GoldSheet:
- Title on GoldSheet if different from above:
- Other: *(e.g., funding will be applied for later)*
- Student Project—no funding or funding provided by student

SCIENTIFIC REVIEW

Although the assurance committees are not intended to conduct peer review of research proposals, the federal regulations include language such as “consistent with sound research design,” “rationale for involving animals or humans” and “scientifically valuable research,” which requires that the committees consider in their review the general scientific relevance of a research study. Proposals that do not meet these basic tests are not justifiable and cannot be approved. If an assurance review committee(s) has concerns about the scientific merit of a project and the project was not competitively funded by peer review or was funded by corporate sponsors, the project may be referred to a scientific review committee. The scientific review committee will be an ad hoc and will consist of your ISU peers and outside experts as needed. If this situation arises, the PI will be contacted and given the option of agreeing that a consultant may be contacted or withdrawing the proposal from consideration.

- Yes ☒ No Has or will this project receive peer review?

If the answer is “yes,” please indicate who did or will conduct the review:

If a review was conducted, please indicate the outcome of the review:

COLLECTION OR RECEIPT OF SAMPLES

Will you be: (Please check all that apply.)

- Yes ☒ No Receiving samples from outside of ISU? See examples below.
- Yes ☒ No Sending samples outside of ISU? See examples below.

Examples include: genetically modified organisms, body fluids, tissue samples, blood samples, pathogens.

If you will be receiving samples from or sending samples outside of ISU, please identify the name of the outside organization(s) and the identity of the samples you will be sending or receiving outside of ISU. If the outside organizations have not been identified, please check no for both questions above.

N/A

Please note that some samples may require a USDA Animal Plant Health Inspection Service (APHIS) permit, a USPHS Centers for Disease Control and Prevention (CDC) Import Permit for Etiologic Agents, a Registration for Select Agents, High Consequence Livestock Pathogens and Toxins or Listed Plant Pathogens, or a Material Transfer Agreement (MTA) EH&S Website.
ASSURANCE

- I certify that the information provided in this application is complete and accurate and consistent with any proposal(s) submitted to external funding agencies.
- I agree to provide proper surveillance of this project to ensure that the rights and welfare of the human subject or welfare of animal subjects are protected. I will report any problems to the appropriate assurance review committee(s).
- I agree that I will not begin this project until receipt of official approval from all appropriate committee(s).
- I agree that modifications to the originally approved project will not take place without prior review and approval by the appropriate committee(s), and that all activities will be performed in accordance with all applicable federal, state, local and Iowa State University policies.

CONFLICT OF INTEREST

A conflict of interest can be defined as a set of conditions in which an investigator’s or key personnel’s judgment regarding a project (including human or animal subject welfare, integrity of the research) may be influenced by a secondary interest (e.g., the proposed project and/or a relationship with the sponsor). ISU’s Conflict of Interest Policy requires that investigators and key personnel disclose any significant financial interests or relationships that may present an actual or potential conflict of interest. By signing this form below, you are certifying that all members of the research team, including yourself, have read and understand ISU’s Conflict of Interest policy as addressed by the ISU Faculty Handbook (http://www.provost.iastate.edu/faculty) and have made all required disclosures.

☐ Yes ☒ No Do you or any member of your research team have an actual or potential conflict of interest?
☐ Yes ☐ No If yes, have the appropriate disclosure form(s) been completed?

SIGNATURES

Signature of Principal Investigator 10/14/09

Signature of Department Chair 10.5.09

The Major Professor/Supervising Faculty member must sign the cover page in the section entitled “For Student Projects”.

PLEASE NOTE: Any changes to an approved protocol must be submitted to the appropriate committee(s) before the changes may be implemented.

Please proceed to SECTION II.
SECTION II: IRB SECTION - STUDY SPECIFIC INFORMATION

Please complete all of the following questions.

STUDY OBJECTIVES

Briefly explain in language understandable to a layperson the specific aim(s) of the study.

To determine if videos using one simple shape (circle), in a variety of rhythms/patterns, can lead a viewer to respond with a particular emotional response (anger, disgust, fear, joy, sadness)

BENEFITS TO SOCIETY AND PARTICIPANTS

Explain in language understandable to a layperson how the information gained in this study will advance knowledge, and/or serve the good of society. Please also describe the direct benefits to research participants; if there are no direct benefits to participants, indicate that. Note: monetary compensation cannot be considered a benefit to participants.

IF the results lead to a particular type of pattern equaling a certain emotion, future designers could use similar patterns to create more powerful messages in their own work

PART A: PROJECT INVOLVEMENT

1) Yes ☒ No Is this project part of a Training, Center, Program Project Grant?

   Director Name: Overall IRB ID:

2) Yes ☒ No Is the purpose of this project to develop survey instruments?

3) Yes ☒ No Does this project involve an investigational new drug (IND)? Number:

4) Yes ☒ No Does this project involve an investigational device exemption (IDE)? Number:

5) Yes ☒ No Does this project involve existing data or records?

6) Yes ☒ No Does this project involve secondary analysis?

7) Yes ☒ No Does this project involve pathology or diagnostic specimens?

8) Yes ☒ No Does this project require approval from another institution? Please attach letters of approval.

9) Yes ☒ No Does this project involve DEXA/CT scans or X-rays?

PART B: MEDICAL HEALTH INFORMATION OR RECORDS

10) Yes ☒ No Does your project require the use of a health care provider’s records concerning past, present, or future physical, dental, or mental health information about a subject? The Health Insurance Portability and Accountability Act established the conditions under which protected health information may be used or disclosed for research purposes. If your project will involve the use of any past or present clinical information about someone, or if you will add clinical information to someone’s treatment record (electronic or paper) during the study, you must complete and submit the Application for Use of Protected Health Information.
PART C: ANTICIPATED ENROLLMENT

<table>
<thead>
<tr>
<th>Estimated number of participants to be enrolled in the study</th>
<th>Total: 500</th>
<th>Males: -</th>
<th>Females: -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check if any enrolled participants are:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Minors (Under 18)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age Range of Minors:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Pregnant Women/Fetuses</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>□ Cognitively Impaired</td>
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<tr>
<td>□ Prisoners</td>
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<tr>
<td>Check below if this project involves either:</td>
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</tr>
<tr>
<td>□ Adults, non-students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Minor ISU students</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>□ ISU students 18 and older</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>□ Other (explain)</td>
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</tbody>
</table>

List estimated percent of the anticipated enrollment that will be minorities if known:

American Indian:  
Alaskan Native:
Asian or Pacific Islander:  
Black or African American:
Latino or Hispanic:

PART D: PARTICIPANT SELECTION

Please use additional space as necessary to adequately answer each question.

11. Explain the procedures and rationale for selecting participants, including the inclusion and exclusion criteria (e.g., where will names come from, what persons will be included or excluded and why, etc.).

1. The survey will use word of mouth, referrals, and flyers to select participants (see attachments 1 & 2)
2. Those interested will email a response, to which I will respond with a consent form and a link to the survey itself (see attachment 3) There will also be a statement about the voluntary and confidential nature of this survey (see attachment 3)  
3. The participants following the link provided in the email will go the site www.surveymonkey where there will be the consent form for the second time, which they will have to agree to proceed.  
4. There will be no exclusion criteria for selecting participants if they are over 18 years of age.

12. Describe the procedures for contacting participants (e.g., letter, email, flyer, advertisements, phone call, etc.). Attach copies of any letters, scripts, flyers, or advertisements that will be used. Recruitment materials should include a statement of the voluntary and confidential nature of the research.

Flyers will be posted at the main in the art/design building.

1. The gathering of participants would require any direct involvement and talking to them about the survey or receiving a referral of response to a flyer. They would be informed that I was conducting a survey on five short videos, and if they would like to participate and could provide me with their email address.  
2. If the participant agrees to participate in the survey, an email (attachment 3) addressing the voluntary and confidential nature of this survey and a copy of the consent form (see attachment 3) including a link to the website where the survey is located (surveymonkey.com) would be sent to the interested participant.  

PART E: RESEARCH PLAN

Include sufficient detail for IRB review of this project independent of the grant, protocol, or other documents.

13. The information needed here is similar to that in the “methods” or “procedures” sections of a research proposal—it should describe the flow of events that will occur during your interactions with subjects. Please describe in detail your plans for collecting data from participants, including all procedures, tasks, or interventions participants will be asked to complete during the research (e.g., random assignment, any conditions or treatment groups into which participants will be divided, mail survey or interview procedures, sensors to be worn, amount of blood drawn, etc.). This information is intended to inform the committee of the procedures used in the study and their potential risk. Please do not respond with “see attached” or “not applicable.”
1. The survey will be conducted in two parts, the first 250 participants will be asked to answer 5 videos. After 250 participants respond to the first survey, a second survey identical to the first survey but with a different 5 videos will be posted. This second survey will be finished when it also receives 250 respondents. (see attachment 5 for videos)

2. At the survey, which is hosted by survey monkey, they would be asked the first question. To whether or not they agree or disagree to the consent form. (see attachment 4)

3. After they agreed to the consent form, they would be asked information about themselves including their gender, age (in the form of an age range), educational level, and their ethnicity (optional question)

4. If those two pages would be completed then the participant would proceed to the actual survey. They would be required to activate the link for the video, which would show them a short 3-7 second video. The video would be followed by a multiple choice question with seven options: anger, disgust, fear, joy, sadness, no emotion, something else. (the "something else" option would text box for the participant to type their own choice of emotion or feeling) Each option in the multiple choice would have five answers ranging from 0 thru 4. (0 would equal no emotion and 4 would equal strong emotion)

4. The process would be repeated until the participant watched and answered all five videos. To which they would be finished with the survey.

14. For studies involving pathology/diagnostic specimens, indicate whether specimens will be collected prospectively and/or already exist “on the shelf” at the time of submission of this review form. If prospective, describe specimen procurement procedures; indicate whether any additional medical information about the subject is being gathered, and whether specimens are linked at any time by code number to the participant’s identity. If this question is not applicable, please type N/A in the response cell.

N/A

15. For studies involving deception or where information is intentionally withheld from participants, such as the full purpose of the study, please explain how persons will be deceived or what information will be withheld. Additionally, a waiver of the applicable elements of consent will be needed. Please complete the "Waiver of Elements of Consent" form (available at the IRB website). If this question is not applicable, please type N/A in the response cell.

N/A

PART F: CONSENT PROCESS

A copy of any translated informed consent documents and an English version should be submitted with the application. Provide the name of the individual who translated the consent documents, their qualifications for translating documents, and in particular informed consent documents, below.

If the consent process does not include documented consent, a waiver of documentation of consent must be requested. If any information about the study is intentionally withheld or misleading (i.e., deception is used), a waiver of the elements of consent must be requested. Forms for requesting waivers are available at the IRB website.

16. Describe the consent process for adult participants (those who are age 18 and older).

Participants will receive the consent form below in the email that follows the word of mouth script. (see attachment 3) The consent form will be available for the participant to read in the email, and also will be available as the first question on the survey itself, in which they will need to answer “agree” in order to continue on through the survey.

17. If your study involves minor children, please explain how parental consent will be obtained prior to enrollment of the minor(s).

N/A

18. Please explain how assent will be obtained from minors (younger than 18 years of age), prior to their enrollment. Also, please explain if the assent process will be documented (e.g., a simplified version of the consent form, combined

Office for Responsible Research/IRB 05/05/09
with the parental informed consent document). According to the federal regulations ... means a child’s affirmative agreement to participate in research. Mere failure to object should not, absent affirmative agreement, be construed as assent.”

PART G: DATA ANALYSIS

19. Describe how the data will be analyzed (e.g. statistical methodology, statistical evaluation, statistical measures used to evaluate results).

The statistical method is an observational study in the form of an online survey. In which the survey would collect observations about the area of interest and then performs statistical analysis. The results would be based on their answers to the gender, age, educational level, and ethnicity imported into excel or spss. Then resulting data would be analyzed for a commonality among their responses.

PART H: RISKS

The concept of risk goes beyond physical risk and includes risks to participants' dignity and self-respect as well as psychological, emotional, legal, social or financial risk.

20. □ Yes ☒ No Is the probability of the harm or discomfort anticipated in the proposed research greater than that encountered ordinarily in daily life or during the performance of routine physical or psychological examinations or tests?

21. □ Yes ☒ No Is the magnitude of the harm or discomfort greater than that encountered ordinarily in daily life, or during the performance of routine physical or psychological examinations or tests?

22. Describe any risks or discomforts to the participants and how they will be minimized and precautions taken. Do not respond with N/A. If you believe that there will not be risk or discomfort to participants, you must explain why.

Their will most likely be discomfort rather than any foreseeable risks. The participants will be subjected to rapid movement of circles across and towards them on the screen. These might make them close their eyes, become slightly disoriented, or look away. The events in each video will be nothing more than what is encountered in routine television or video.

23. If this study involves vulnerable populations, including minors, pregnant women, prisoners, the cognitively impaired, or those educationally or economically disadvantaged, what additional protections will be provided to minimize risks?

N/A

PART I: COMPENSATION

24. □ Yes ☒ No Will participants receive compensation for their participation? If yes, please explain.

Do not make the payment an inducement, only a compensation for expenses and inconvenience. If a person is to receive money or another token of appreciation for their participation, explain when it will be given and any conditions of full or partial payment. (E.g., volunteers will receive $5.00 for each of the five visits in the study or a total of $25.00 if he/she completes the study. If a participant withdraws from participation, they will receive $5.00 for each of the visits completed.) It is considered undue influence to make completion of the study the basis for compensation.
PART J: CONFIDENTIALITY

25. Describe below the methods that will be used to ensure the confidentiality of data obtained. (For example, who has access to the data, where the data will be stored, security measures for web-based surveys and computer storage, how long data or specimens will be retained, anticipated date that identifiers will be removed from completed survey instruments and/or audio or visual tapes will be erased, etc.)

| The data will be stored originally on the website “surveymonkey.com” where it will be accessed and downloaded by myself, Aaron Neff, and stored on my own personal computer until study is done. The results will only be kept online on the website listed above until the quota of participants for my study is reached (500) |
| The website information would be accessible through my password and no one else on the site would be allowed access through public sharing or anything or that nature. |
| No personal information will be collected the data would be strictly numbers and would be removed once the study is done. |
| No video/audio would be collected |

Office for Responsible Research/IRB 05/05/09
PART K: REGISTRY PROJECTS

26. To be considered a registry: (1) the individuals must have a common condition or demonstrate common responses to questions; (2) the individuals in the registry might be contacted in the future; and (3) the names/data of the individuals in the registry might be used by investigators other than the one maintaining the registry.

☐ Yes ☒ No Does this project establish a registry?

If “yes,” please provide the registry name below.

Checklist for Attachments

Listed below are the types of documents that should be submitted for IRB review. Please check and attach the documents that are applicable for your study:

☐ A copy of the informed consent document OR ☒ Letter of introduction containing the elements of consent
☐ A copy of the assent form if minors will be enrolled
☐ Letter of approval from cooperating organizations or institutions allowing you to conduct research at their facility
☐ Data-gathering instruments (including surveys)
☒ Recruitment fliers, phone scripts, or any other documents or materials participants will see or hear

The original signed copy of the application form and one set of accompanying materials should be submitted for review. Federal regulations require that one copy of the grant application or proposal be submitted for comparison with the application for approval.

FOR IRB USE ONLY:

Action by the Institutional Review Board (IRB):

☒ Project approved. Date: 11/30/09

☐ Project is exempt. Date: ______________________________

☐ Project not approved. Date: ______________________________

☐ IRB approval is not required. Date: ______________________________

☐ Project is not research according to the federal definition.

☐ Project does not include human subjects as defined by the federal regulations.

_________________________  ___________  ___________
IRB Approval Signature Date  11/30/09
SECTION III: ENVIRONMENTAL HEALTH AND SAFETY INFORMATION

☐ Yes ☒ No   Does this project involve human cell or tissue cultures (primary OR immortalized), or human blood components, body fluids or tissues?

PART A: HUMAN CELL LINES

☐ Yes ☒ No   Does this project involve human cell or tissue cultures (primary OR immortalized cell lines/strains) that have been documented to be free of bloodborne pathogens? If the answer is "yes," please answer question 1 below and attach copies of the documentation.

1) Please list the specific cell lines/strains to be used, their source and description of use.

<table>
<thead>
<tr>
<th>CELL LINE</th>
<th>SOURCE</th>
<th>DESCRIPTION OF USE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Add New Row

2) Please refer to the ISU “Bloodborne Pathogens Manual,” which contains the requirements of the OSHA Bloodborne Pathogens Standard. Please list the specific precautions to be followed for this project below (e.g., retractable needles used for blood draws):

Anyone working with human cell lines/strains that have not been documented to be free of bloodborne pathogens is required to have Bloodborne Pathogen Training annually. Current Bloodborne Pathogen Training dates must be listed in Section I for all Key Personnel. Please contact Environmental Health and Safety (294-5359) if you need to sign up for training and/or to get a copy of the Bloodborne Pathogens Manual (http://www.ehs.iastate.edu/cms/default.asp?action=article&ID=214)

PART B: HUMAN BLOOD COMPONENTS, BODY FLUIDS OR TISSUES

☐ Yes ☒ No   Does this project involve human blood components, body fluids or tissues? If “yes,” please answer all of the questions in the “Human Blood Components, Body Fluids or Tissues” section.

1) Please list the specific human substances used, their source, amount and description of use.

<table>
<thead>
<tr>
<th>SUBSTANCE</th>
<th>SOURCE</th>
<th>AMOUNT</th>
<th>DESCRIPTION OF USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.g., Blood</td>
<td>Normal healthy volunteers</td>
<td>2 ml</td>
<td>Approximate quantity, assays to be done.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Add New Row

2) Please refer to the ISU “Bloodborne Pathogens Manual,” which contains the requirements of the OSHA Bloodborne Pathogens Standard. Specific sections to be followed for this project are:

Office for Responsible Research/IRB 05/05/09 10
Anyone working with human blood components, body fluids or tissues is required to have Bloodborne Pathogen Training annually. Current Bloodborne Pathogen Training dates must be listed in Section I for all Key Personnel. Please contact Environmental Health and Safety (294-5359) if you need to sign up for training and/or to get a copy of the Bloodborne Pathogens Manual (http://www.ehs.iastate.edu/cms/default.asp?action=article&ID=214).
Attachment 1 (word of mouth)

Word of Mouth

Hello,

My name is Aaron Neff, a graduate student as Iowa State University. I am conducting a survey to collect data, on a selection of self-made videos, to complete my thesis.

I thought you might be interested in completing this short survey, which ask questions about your emotional responses to five videos I have created (It would take you about 15 minutes and I would appreciate it)

If you would like to help me out, I will send you a link to the survey along with some additional details.

Thanks
NEED PARTICIPANTS
to
WATCH/videos
about rhythms and emotions
and
ANSWER SIMPLE QUESTIONS
INTERESTED IN COMPLETING A SHORT 15 MINUTE SURVEY?
CONTACT:
NEFFSURVEY@GMAIL.COM
Hello,

Thank you for your interest in my survey. Below is a consent form for you to review the details regarding the survey. Keep in mind that this is strictly a voluntary and confidential survey and you are allowed to quit at any time.

https://www.surveymonkey.com/s.aspx?sm=Zhy1DWvod00vifG10vQ1Oaw_3d_3d

**CONSENT FORM FOR: SENSING RHYTHM, A DESIGN PATTERN FOR EMOTIONS**

This form describes a research project. It has information to help you decide whether or not you wish to participate. Research studies include only people who choose to take part—your participation is completely voluntary. Please discuss any questions you have about the study or about this form with the project staff before deciding to participate.

**Who is conducting this study?**

This study is being conducted by Aaron Neff

**Why am I invited to participate in this study?**

You are being asked to take part in this study because you are [you are a member of the 21st century who is willing to participate in a study involving the internet and video media. You should not participate if [you are under age 18]

**What is the purpose of this study?**

The purpose of this study is [create a set of videos using a variety of rhythms in order to determine and basic patterns for some of humanity’s basic emotions, anger, disgust, fear, joy sadness. Future designers could then use similar patterns to create more powerful messages in their own work.]

**What will I be asked to do?**

If you agree to participate, you will be asked to [You will be asked to answer four basic questions about your gender, age, education level, and ethnicity. Then you follow a link to where you will be shown five different videos each followed by a multiple choice question with seven different options. You will then rate the videos on a 0-4 scale relating to your personal emotional reaction to the video. At no point will you be asked for personal information, recorded or be contacted for follow up information]

Your participation will last for [about fifteen minutes total. The survey should take about two minutes for each video plus the time required to read the consent form and instructions.]

**What are the possible risks and benefits of my participation?**

Risks – The possible risks related to your participation in this research are [possible discomfort due to the rapid movement of circles across and towards the screen. These might
make you close your eyes, become slightly disoriented, or look away. The events in each video will be nothing more than what is encountered in routine television or videos.

Benefits – You may not receive any direct benefit from taking part in this study. We hope that this research will benefit society by [enabling designers in the future create more meaningful messages and a more emotional viewing experience.]

**How will the information I provide be used?**

The information you provide will be used for the following purposes: [The information will be included in a thesis titled: *Sensing Rhythm, A Design Pattern for Emotions* by Aaron Neff at Iowa State University. As well as the chance the results would be future published in articles and or a book.]

**What measures will be taken to ensure the confidentiality of the data or to protect my privacy?**

Records identifying participants will be kept confidential to the extent allowed by applicable laws and regulations. Records will not be made publicly available. However, federal government regulatory agencies, auditing departments of Iowa State University, and the ISU Institutional Review Board (a committee that reviews and approves research studies with human subjects) may inspect and/or copy your records for quality assurance and analysis. To ensure confidentiality to the extent allowed by law, the following measures will be taken [e.g., subjects will be assigned a unique code to identify each individual based only on the information regarding gender, age, education, and ethnicity. (Not your name) If the results are published, your identity will remain confidential.

**Will I incur any costs from participating or will I be compensated?**

You [will not] have any costs from participating in this study, and you [will not] be compensated for participating in this study.

**What are my rights as a human research participant?**

Participating in this study is completely voluntary. You may choose not to take part in the study or to stop participating at any time, for any reason, without penalty or negative consequences, and you can skip any questions that you do not wish to answer.

**Whom can I call if I have questions or problems?**

You are encouraged to ask questions at any time during this study.

- For further information about the study contact [Aaron Neff at neff8684@gmail.com or Sunghyun Kang at shrkang@iastate.edu]
- If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, IRB@iastate.edu, or Director, (515) 294-3115, Office for Responsible Research, 1138 Pearson Hall, Iowa State University, Ames, Iowa 50011.

Here is the link to take the survey at surveymonkey.com

https://www.surveymonkey.com/s.aspx?sm=Zhy1DWyod00yfG10vQlOaw_3d_3d
1. Survey Entrance

This is a survey conducted by Aaron Neff a graduate student at Iowa State. You will be watching 5 videos of a shape moving around the screen and rating the possible emotion choices. These are short videos, and you may not realize they are already finished. Feel free to watch each video several times if you want and then answer the questions.
1. Survey Entrance

This is a survey conducted by Aaron Neff, a graduate student at Iowa State. You will be watching 5 videos of a shape moving around the screen and rating the possible emotion choices. These are short videos, and you may not realize they are already finished. Feel free to watch each video several times if you want and then answer the questions.

please print out a copy of the informed consent document to keep for your own records. To do so, right click on the form below and click "save picture as" you will then have a copy which you can print out a copy of.

FORM FOR: SENSING RHYTHM, A DESIGN PATTERN FOR EMOTIONS

This form describes a research project. Is the information to help you decide whether or not you wish to participate. Research studies include only people who choose to take part — your participation is completely voluntary. If you choose not to participate in this study you may refuse to take part in the study. The study is voluntary. If you choose not to participate in the study you may refuse to take part in the study. The study is voluntary.

Who is conducting this study?
This study is being conducted by Aaron Neff.

Why am I invited to participate in this study?
You are being invited to take part in this study because you are [male] and [you are a member of the 21st century who is willing to participate in a study involving the internet and video media. You should not participate if you are under age 18].

What is the purpose of this study?
The purpose of this study is to create a set of videos using a variety of rhythms in order to determine and basic patterns for some of humanity’s basic emotions, anger, disgust, fear, joy, sadness. Future designers could then use similar patterns to create more powerful messages in their own work.

What will I be asked to do?
If you agree to participate, you will be asked to answer four basic questions about your gender, age, education level, and location. Then you will be asked a series of questions about your personal emotional reactions to the video. At no point will you be asked for personal information, recorded or be contacted for follow-up information.

Your participation will last for about fifteen minutes total. The survey should take about two minutes for each video plus the time required to read the consent form and instructions.

What are the possible risks and benefits of my participation?
Risks - The possible risks related to your participation in this research are [possible discomfort due to the time devoted to the task of creating and editing the video].

Benefits - You may not receive any direct benefits from taking part in this study. We hope that this research will benefit society by [improving designers in the future create more meaningful messages and a more emotional viewing experience].

How will the information I provide be used?
The information you provide will be used for the following purposes: [The information will be included in a thesis related to the topic].

What measures will be taken to ensure the confidentiality of the data or to protect my privacy?
Records identifying participants will be kept confidential to the extent allowed by applicable laws and regulations. Records will not be made publicly available. However, federal government regulatory agencies, auditing departments of Iowa State University, and the IRB Institutional Review Board (IRB) committee that reviews and approves research studies with human subjects may review and/or copy your records for quality assurance and analysis.

To ensure confidentiality to the extent allowed by law, the following measures will be taken: [identified subjects will be assigned a unique code to identify individuals based only on the information regarding gender, age, education, and ethnicity].

Will I receive any costs from participating or will I be compensated?
You [will not] have any costs from participating in this study, and [will not] be compensated for participating.

What are my rights as a human research participant?
Participating in this study is completely voluntary. You may choose not to take part in the study or to stop participating at any time. You may refuse without penalty or negative consequences. You may withdraw your consent to participate in this study at any time.

Whom can I call if I have questions or problems?
For further information about the study contact: [Aaron Neff at aernf@iastate.edu or Sanghyu Kang at skang@iastate.edu].

If you have any questions about the rights of research subjects or research-related inquiries, please contact the IRB Administrator, 752 240-4566, IRB chair, or Director, 752 294-3455, Office for Responsible Research, Iowa State University, Ames, Iowa 50011.

You have read the above statement and you

[ ] Agree
[ ] Disagree

Next
You have read the above statement and you _____

- Agree
- Disagree

2. About Yourself

The following information will be used for the survey only:

Gender

- Male
- Female

Age

- 18-25
- 26-35
- 36-45
- 45-60
- 60+

Educational Level

- Some High School
- High School Diploma/equivalency
- Some College
- Bachelor's Degree
3. video 1 of 5

Hello, This is the first video of five total videos you will be watching. Click here for the first video. The link will open a short 3-7 second video for you to watch in a new tab. When you are done watching the video however many times you wish, close the link and return to this page. Then answer the following questions as they apply.

1a. If the video contained no emotion, check the box and proceed to the next page

- no emotion
1b. If you did not check the box above, rate the following emotions as they apply

<table>
<thead>
<tr>
<th></th>
<th>0 (none)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 (strong)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disgust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sadness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If "something else" (please specify)

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4. video 2 of 5

This is the second video of five total videos you will be watching. [Click here for the second video] The link will open a short 3-7 second video for you to watch in a new tab. When you are done watching the video however many times you wish, close the link and return to this page. Then answer the following questions as they apply.

---

2a. If the video contained no emotion, check the box and proceed to the next page

- no emotion

---

2b. If you did not check the box above, rate the following emotions as they apply

<table>
<thead>
<tr>
<th></th>
<th>0 (none)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 (strong)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disgust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sadness</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Date</td>
<td>Sex</td>
<td>Age</td>
<td>Educational Level</td>
<td>Major/Degree</td>
<td>1a. Response</td>
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<td>---------------</td>
<td>--------------</td>
</tr>
<tr>
<td>03/07</td>
<td>Agree</td>
<td>Female</td>
<td>18-25</td>
<td>Some College</td>
<td>Geography</td>
</tr>
<tr>
<td>01/22</td>
<td>Agree</td>
<td>Female</td>
<td>18-25</td>
<td>Some College</td>
<td>Social work</td>
</tr>
<tr>
<td>12/22</td>
<td>Agree</td>
<td>Female</td>
<td>18-25</td>
<td>Some College</td>
<td>Radiology</td>
</tr>
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<td>12/08</td>
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<td>Female</td>
<td>18-25</td>
<td>Some College</td>
<td>Visual Comm.</td>
</tr>
<tr>
<td>01/22</td>
<td>Agree</td>
<td>Female</td>
<td>18-25</td>
<td>Bachelor's Degree</td>
<td>Criminal Justice</td>
</tr>
<tr>
<td>12/14</td>
<td>Agree</td>
<td>Female</td>
<td>18-25</td>
<td>Bachelor's Degree</td>
<td>Business Admin</td>
</tr>
<tr>
<td>01/11</td>
<td>Agree</td>
<td>Female</td>
<td>26-35</td>
<td>Bachelor's Degree</td>
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<tr>
<td>12/22</td>
<td>Agree</td>
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<td>26-35</td>
<td>Bachelor's Degree</td>
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<tr>
<td>12/14</td>
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</tr>
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<td>01/18</td>
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<td>26-35</td>
<td>Bachelor's Degree</td>
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<td>01/24</td>
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<td>36-45</td>
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<td>High School Diploma</td>
</tr>
<tr>
<td>01/25</td>
<td>Agree</td>
<td>Female</td>
<td>36-45</td>
<td>Bachelor's Degree</td>
<td>High School Diploma</td>
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<tr>
<td>12/16</td>
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<td>Female</td>
<td>36-45</td>
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<td>01/19</td>
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<td>03/07</td>
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<td>Female</td>
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<tr>
<td>03/09</td>
<td>Agree</td>
<td>Female</td>
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<tr>
<td>03/06</td>
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<td>Female</td>
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<td>01/20</td>
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First Survey Results  Videos 1-5 Female (part 1)
### First Survey Results  Videos 2-3 Female (part 2)

<table>
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<td>4 (strong)</td>
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Notes:
- **Response Anger Disgust Fear Joy Sadness Write In**
- **no emotion**
- **4 (strong)**
- **stress**
- **fun - artwork**
- **Pulsating/cluttered**
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**Recorded Emotions:**
- Anger
- Disgust
- Fear
- Joy
- Sadness

*Responses are indicated with 0 (none) and 4 (strong) for intensity.*

---

**Emotion Categorization:**
- Cheerful
- Exciting
- Fireworks
- Attention
- Surprise/worry
- Annoying
- No emotion

*Note: The table includes a range of responses for each emotion category.*
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- Melancholy
- Wonder
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## APPENDIX E. ADDITIONAL CHARTS/GRAPHS

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(34 people)

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### Survey I Age Group 18-25
(14 people) 7 female 7 male

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The exponential number signifies the number of those responses which were the highest.
the exponential number signifies the number of those responses which were the highest
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the expodential number signifies the number of those responses which were the highest
the exponential number signifies the number of those responses which were the highest

Survey II  High School Diploma Responses
(8 people) 4 female 4 male

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Survey II  Some College Responses
(29 people) 16 female 13 male

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Survey II  Bachelor Degree Responses
(26 people) 11 female 15 male

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### Survey II Masters Degree Responses
(7 people) 5 female 2 male

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### Survey II Doctorate Degree Responses
(4 people) 1 female 3 male

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The exponential number signifies the number of those responses which were the highest.
ACKNOWLEDGEMENTS

I would like to take this opportunity to express my thanks to those who helped me with various aspects of this thesis. First and foremost, I thank my parents, Mike and Cindy and my brother Ryan, for their guidance, patience, love and support throughout the entire thesis. Your words of encouragement have often kept alive my slim hopes for completing my graduate education. At this time, I would also like to thank my Aunt Annette for all her generous help with my thesis. Your time, wisdom, guidance and helpful comments were very appreciated.

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Thanks for reading