Aesthetic Experience of a Synesthetic Dress

by

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Abstract

Presently, there is a cultural phenomenon whereby technology-enabled dresses are displayed for aesthetic appraisal in museum contexts. This study was an exploratory investigation of museum visitors' aesthetic experiences from beholding a synesthetic dress (i.e., a dress that replicates the experience of synesthesia when colors are heard and sounds are seen through the use of colored LED lights and digital music) using three distinct data elicitation approaches. As a qualitative study applying a grounded theory approach, the I-SKE model was used in conjunction with obtaining physiological measures, observational data and interview data. This study investigated how 44 millennial participants aesthetically processed a synesthetic dress during four different dress viewings (i.e., dress-only, dress with digital music, dress with colored LED lights, and dress with synchronized digital music and colored LED lights). Results support that apparel with music and colored LED lights create a much richer aesthetic experience due to participants reporting this dress to be the most interesting, the most impressed by this dress, and having an increased EDA arousal response. This research is applicable to inform such fields as apparel, performing arts, and museum research.

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CHAPTER I. INTRODUCTION

Background

Beholding is a process deemed by Mida and Kim (2015, p. 7) as "slow looking" to observe, reflect upon, and interpret an object. This response is instigated by viewing interesting and pleasing objects that produce more than a glance to "savor" the experience (Smith & Smith; 2001, p. 235). Intentionally fixing one's gaze on a material object may be more than enjoyable by providing insight into society and culture (Edwards, 2017; Mida, Green, & Lillethun, 2017; Mida & Kim, 2015). For instance, objects considered aesthetically stimulating to society are typically displayed within a museum context and represent cultural aspects of beauty, pleasure, and interest. Since museums are establishments where individuals intentionally go to have an aesthetic experience of delight or intrigue from beholding an object, it is noteworthy that synesthetic dresses (i.e., multisensory technology-operated dresses) have been displayed at museums in recent years.

For example, the Metropolitan Museum of Art (the Met) in New York has featured Hussein Chalayan's *Video Dress* that operated 15,600 light-emitting diode (LED) lights with electronic circuit boards hand-stitched into the dress (Bolton, 2016; Schubert, 2006). This dress emulates a wearable video screen where each LED light represents a colored television pixel to form a greater motion picture image on the dress. Similarly, Museum of Design Atlanta (MODA) has exhibited the dress *Pixi Interactive* that used 600 LED lights where each of the LED lights can change into approximately 16 million different colors (Cochran, McCall, Kenna, & Cao, 2015). The presence of these synesthetic dresses in a museum gallery communicates to the beholder that these objects are esteemed by current culture as valuable artworks created for aesthetic evaluation.

The present societal viewpoint that synesthetic dresses are artworks fuels the continued debate of "What is art?" and whether fashion (especially synesthetic fashion) is considered art. Traditionally, painting and sculpture have been considered art due to their solely aesthetic properties devoid of utilitarian function. Therefore, the "sit there and look pretty" aspect of artworks in the form of paintings and sculpture has been challenged by Marcel Duchamp's *Fountain*, which was a commercially manufactured urinal submitted as an artwork to be aesthetically evaluated (Shimamura, 2013; TATE 2018). This seminal artwork, that in 2004 was considered the most influential modern artwork according to 500 art experts (Palmer & Shimamura, 2012), has allowed other everyday usable objects such as dresses to be considered as aesthetic objects to be evaluated.

In particular, the MET has emerged as a forerunner of displaying fashion as art when it merged with The Museum of Costume Art in 1946, almost a decade after The Museum of Costume Art was initially formed in 1937 (The Costume Institute, 2014). Influential individuals such as Diana Vreeland helped to consult on costume exhibitions for the Met (Dwight, 2002; The Costume Institute, 2014) thereby promoting fashion to be viewed as art. In contrast, technology, which is more scientific-based compared to aesthetic in nature, is less likely to be perceived as an art form. However, the merger of both fashion and technology has led to individuals perceiving synesthetic dresses as an art form.

The fusion of art with science to form aesthetic-technology in a synesthetic dress creates a unique category of objects to be aesthetically understood. For instance, fashion has maintained certain multisensory cues for aesthetic evaluation such as the touch of velvet, the visual impact of a designer silhouette displaying exceptional color, the sound of rustling taffeta, and the smell of wet wool. These aesthetic aspects of dress are historically familiar to humanity as either

aesthetically pleasing (e.g., beautiful and desirable) or aesthetically displeasing (e.g., unattractive and undesirable). However, with the recent incorporation of technology in fashion, there needs to be a re-evaluation of the aesthetic experience from synesthetic dresses that use technology-enabled multisensory cues such as the touch of sensors, the visual impact of colored LED lights, and the sound of digital music.

According to Fiore (2010), the aesthetic experience is multisensory by using many sensations such as sight, smell, touch, hearing, and taste. These sensations prompted by the multisensory cues of a synesthetic dress can elicit replicated aspects of synesthesia. Synesthesia is the merging of sensations such as seeing sound or hearing colors (Phillips, 2008), which may lead to enhanced aesthetic experiences. For instance, the beholder's heightened sensations (i.e., enjoyment of the formal qualities of the artwork such as color), knowledge (i.e., cognitive interest and understanding of the artwork), and emotions (i.e., the beholder's feelings towards the artwork) may then lead to the beholder's profound aesthetic experience (Shimamura, 2013). By merging dress sensory cues (i.e., the drape of silk) with technological sensory cues (i.e., digital music and colored LED lights), individuals experiencing aspects of synesthesia by seeing sounds and hearing colors in a synesthetic dress may lead to the beholder's enhanced aesthetic experience through heightened sensation, knowledge, and emotion.

Such enhanced aesthetic experiences may be further explored using physiological devices (e.g., eye-tracking technology and wrist sensors), which capture individual's automatic responses. For instance, eye-tracking technology allows the researcher to be able to behold what the participant is viewing through the generation of heat maps and gaze plots (Bojko, 2013), which is an invaluable tool when conducting visual aesthetic research. Similarly, wrist sensors capture electrodermal activity (EDA), which is micro-perspiration, that indicates whether an

individual is aroused (Rajava, 2004) during the viewing of an artwork. Therefore, this study utilizes physiological measures to further understand the beholder's aesthetic experience.

Problem Statement

According to the literature, one reason for viewing art includes receiving hedonic rewards (Leder, Belke, Oeberst, & Augustin, 2004). If viewers' intentions of having gratifying aesthetic experiences at a museum are unmet, there may be fewer museum memberships, potentially leading to fewer museums being open to the public, and possibly, fewer aesthetic objects created that could be viewed by society. Since museums are a platform to foster learning, reflective contemplation, emotional release, investigative self-discovery, historical preservation and much more, significant attention should be given to how museums can provide viewers with hedonic rewards for a returned investment of maintaining open doors to the public. In particular, millennials are a generational cohort that are important to the future of museums (Foreman-Wernet, Dervin, & Funk, 2014) and significant attention should be given to their aesthetic preferences.

According to Crane and Bovone (2006), clothing is a material culture object that is intended to resonate with its consumers, and therefore, synesthetic dresses as artworks should similarly resound with millennial museum visitors who are consumers of aesthetic experiences. To satisfy the aesthetic taste levels of beholders of refined artworks, art directors should obtain information about their patrons' tastes to offer objects of aesthetic pleasure that meet their needs and desires. Due to museum art directors already determining that synesthetic dresses are worthy examples of art for display, there needs to be more information regarding how these dresses are aesthetically processed to be deemed aesthetically appealing to museum visitors.

In the past, paintings have been explored in research as a type of art that was aesthetically evaluated (Silvia, 2012). However, there is limited research on synesthetic dresses being displayed as artworks to induce pleasant feelings and cognitive stimulation without overstimulating the senses beyond enjoyment. Furthermore, there is a gap in the literature regarding how multisensory dress sensory cues, especially novel cues such as sound and light, are aesthetic processed. As such, this research is unprecedented. Therefore, it is important to determine if, for the purposes of this study, a silk-painted dress created by the researcher is solely considered to be an aesthetically-pleasing artwork or if the addition of digital music with colored LED lights enhances the beholder's aesthetic experience to produce appreciation for the artwork.

Significance of the Study

In 2016, the Met's seventh most visited exhibition, *Manus x Machina: Fashion in an Age of Technology*, had 752,995 visitors (Met, 2016). The significant attendance achieved during to this exhibition, which focused on fashion merged with technology by featuring synesthetic dresses, is notable. Therefore, public interest in synesthetic dresses as museum-displayed aesthetic objects is an intriguing phenomenon at present that should be further investigated. Since there is limited research on the impact of aesthetically evaluating synesthetic dresses, this study seeks to address a gap in the literature. It is important to investigate the impact of sensory cues on the viewer's aesthetic experience, since experiencing certain sensory cues may positively or adversely impact the viewer's aesthetic experience. As mentioned earlier, this study may benefit museum art directors in understanding which sensory cues enhance a visitor's aesthetic experience.

This research may also help diverse aspects of the apparel field, such as customized clothing and performing arts costumes, by providing deeper insight into how individuals respond

to certain sensory cues outside of the present study's museum context. Aesthetic design decisions by artists and designers may improve due to understanding what sensory cues will produce more aesthetically pleasing dresses. These improved design decisions may enhance individuals' daily quality of life such as synesthetes to feel understood, individuals with disabilities such as autism to relax by not experiencing over-stimulation due to sensitivities, or individuals in general to interact with more aesthetically-desired clothing. This information would be important to know since wearable technology sectors are forecasted to increase in profitability with an annual growth rate of 23% over the next five years (Wade, 2017).

This study contributes to the literature on aesthetics theory by utilizing Shimamura's (2013) I-SKE model and Berlyne's (1971) Wundt curve. Presently, there is limited research that utilizes the I-SKE model, and by utilizing this model as SKE-I, the revised model may be both applicable and beneficial for future aesthetic research. In addition to theoretical contributions, this research is unique by advancing and expanding upon research applications for utilizing physiological measures such as to capture individuals' aesthetic responses to a synesthetic dress. Furthermore, although there are studies that use eye-tracking technology for artworks (Massaro et al., 2012) and garments (Park, Woods, & DeLong, 2010) independently, there is currently a gap in the literature of eye-tracking technology being used for garments that are artworks. The use of both eye-tracking and skin sensor devices to conduct research in the context of a synesthetic garment as an artwork has methodological significance and remains unparalleled in the areas of aesthetics, apparel, and museum research.

Purpose Statement

As a qualitative study applying a grounded theory approach, this study was an exploratory investigation of museum visitors' aesthetic experiences from beholding a synesthetic

dress using three distinct data elicitation approaches (i.e., physiological measures, observational data and interview data). The purpose of this study was to investigate the impact that synesthetic dress sensory cues (i.e., dress, digital music, and colored LED lights) had on the beholder's aesthetic experience using the I-SKE model (Shimamura, 2012). This model provided a deductive framework to form an emergent theory for the social phenomena of beholding synesthetic dresses in museums to examine beholder's sensation, knowledge, and emotion (SKE) aspects (Shimamura, 2012). These beholder aspects were then used to determine the beholder's aesthetic experience from exposure to the artwork (i.e., synesthetic dress sensory cues). As for the artist's intention (I) to create artwork in the I-SKE model (Shimamura, 2012), this study proposed to examine if the artist's intention for the artwork to be aesthetically valued by the beholder was attained. Therefore, this study reverses the I-SKE model to be SKE-I by redefining the artist's intention (I) as an outcome to viewing the artwork. This study examined the beholder's aesthetic experience from beholding synesthetic dress sensory cues by using variables from the I-SKE model and from this analysis an emergent inductive theory was proposed.

Objectives

The specific objectives of this study are:

- To examine the influence that a synesthetic dress's sensory cues [digital music, colored LED lights, both, or none] have on the beholder's sensation.
- To examine the influence that a synesthetic dress's sensory cues [digital music, colored LED lights, both, or none] have on the beholder's knowledge.
- To examine the influence that a synesthetic dress's sensory cues [digital music, colored LED lights, both, or none] have on the beholder's emotion.

- To examine the influence that a synesthetic dress's sensory cues [digital music, colored LED lights, both, or none] have on the beholder's aesthetic experience.
- To examine the influence that the beholder's sensation, knowledge, and emotion have on the beholder's aesthetic experience.

Definition of Terms

- Aesthetic Experience is the outcome of the beholder's sensation, knowledge, and emotional processing of an artwork (Shimamura, 2013).
- Areas of Interest (AOI) are locations of eye fixation on the dress that the beholder found relevant (Bojko, 2013).
- Areas of Interest (AOI) Total Fixation Duration is the total time that each participant fixated on each area of interest, which does not include times for blinking and saccades (Bojko, 2013).
- Areas of Interest (AOI) Time to First Fixation is the time to first fixation for each area of interest, which determines how rapidly areas of interest are noticed (Bojko, 2013).
- Artist's Intention (I) is to create a profound aesthetic experience for the beholder, which is determined by how impressed the beholder is by the artwork from experiencing awe due to profound stimulation (Shimamura, 2013; Silvia, Fayn, Nusbaum, & Beaty, 2015).
- Artwork is the material object created for aesthetic evaluation (Shimamura, 2013).
- Beholder is the viewer of an artwork (Shimamura, 2013).
- Digital Music is a waveform audio (.wav) file converted to sounds that play through audio speakers (Hughes & Lang, 2003).

- Electrodermal Activity (EDA) indicates participants' arousal based upon automatic nervous system responses such as sweat production (Ohme, Matukin, & Pacula-Lesniak, 2011; Rajava, 2004).
- Emotion (E) is the feeling of the beholder towards the artwork (Shimamura, 2013), which is based on pleasant or unpleasant responses (Desmet, 2002).
- Fixations are when the eye is motionless for long stationary gazing that lasts roughly from a tenth to a half of a second typically (Bojko, 2013; Ohme et al., 2011).
- Gestalt is known as the entire impression of an artwork in its totality (Berlyne, 1971).
- Grounded Theory is a methodological approach to qualitative data analysis used to develop a framework that explains how a social phenomenon is experienced through the collection of multiple forms of data (e.g., using interview data and possibly observations as well as visuals) to reach data saturation (Creswell, 2013; Schwandt, 2007).
- Impression Formation Theory applied to the present study is where isolated impressions of a dress's sensory cues can alter the overall impression of the synesthetic dress (Asch, 1946).
- Heat Maps are visuals that indicate where the beholder(s) focused the most on an object by using color temperatures (e.g., red indicates heat denoting more gazing compared to cooler temperature colors such as orange, yellow, green, or blue) to indicate the degree of intensity for fixations (Bojko, 2013).
- I-SKE model is a theoretical framework whereby an artwork, created according to the artist's intention (I), is processed through the beholder's sensation, knowledge, and emotion (SKE) for aesthetic evaluation (Shimamura, 2012).

- Knowledge (K) is the beholder's cognitive interest towards the artwork to understand the artwork's meaning (Shimamura, 2013), which is measured by the beholder assigning meaning to the artwork (Belke, Leder, & Augustin, 2006; Silvia et al., 2015).
- Light-Emitting Diode (LED) is a semiconductor that emits photons when electricity is applied to create different colors (Schubert, 2006).
- Multisensory is the stimulation of more than one sense such as sight, smell, touch, hearing, and taste (Fiore, 2010).
- Optimal Sensation is when the beholder has a pleasure-arousal response (e.g., increased EDA, approach behaviors, tactile response, smiles, prolonged gazing, verbalizing the artwork has a graceful flow, etc.) to the formal qualities of an artwork (Berlyne 1971; Shimamura, 2013).
- Optimal Knowledge is when the beholder has cognitive stimulation (e.g., straight-faced expressions, prolonged gazing, verbalizing that the artwork is interesting/has a story behind it/says something about art itself/associated with a memory, etc.) towards the artwork as being interesting and understandable (Berlyne 1971; Shimamura, 2013).
- Optimal Emotion is when the beholder has pleasant emotions (e.g., joyful facial expressions such as a smile, verbalizing that they liked the artwork) towards the artwork (Berlyne 1971; Desmet, 2002; Shimamura, 2013).
- Optimum Stimulation Level (OSL) is an individual's preferred extent of arousal from an object (Fiore, Lee, Kunz, & Campbell, 2001).

- Physiological Devices are eye-tracking glasses (i.e., a tool used to measure where and how long the beholder views the dress) and a wrist skin sensor (i.e., a tool that measures arousal through sweat production) to determine the beholder's sensations towards the artwork (Ohme et al., 2011).
- Profound Aesthetic Experience is when the beholder's SKE is aroused (Berlyne 1971; Shimamura, 2013) for the beholder to be impressed with the artwork (Silvia et al., 2015).
- Prolonged Gazing is a pleasurable response to looking at an artwork for an average time of 27.2 seconds (Smith & Smith, 2001).
- Saccades are dashing eye movements that are short, rapid, and have quick stops that happen typically three to four times a second (Bojko, 2013; Ohme et al., 2011).
- Sensation (S) is the beholder's enjoyment of the formal artistic qualities of the artwork (i.e., the elements and principles of art) such as line, shape, and color (Shimamura, 2013), which is measured through arousal (Berlyne, 1971).
- Sensory Dress Cues are aspects of the synesthetic dress that stimulate the senses such as the drape of silk, silhouette, the color of fabric, colored LED lights, and digital music.
- SKE-I Model is the reverse of the I-SKE model (Shimamura, 2012) whereby an artwork is aesthetically processed according to the beholder's sensation, knowledge, and emotion (SKE) for an aesthetic experience known as the artist's intention (I).
- Synesthesia is the merging of senses such as seeing sound (Phillips, 2008).
- Synesthetic Dress is a multisensory technology-enabled garment that allows individuals to have the experience of synesthesia (Phillips, 2008).
- Wundt Curve illustrates the point when moderate states of arousal and pleasure are ideal for optimal aesthetic experiences (Berlyne, 1971).

CHAPTER 2. REVIEW OF LITERATURE

This chapter provides a review of literature along with an overview of Shimamura's (2012) I-SKE model as the theoretical framework for the present study. The structure of this chapter begins with an introduction of the theoretical framework with an overview on the literature with subsequent research questions.

Theoretical Framework for I-SKE Model

Shimamura's (2012) I-SKE model is a conceptual framework for experiencing artworks. The I-SKE model examines the artist's intention (I) to create an art object for aesthetic evaluation that is appraised based on the beholder's sensation (S), knowledge (K), and emotion (E) as shown in Figure 1 (Shimamura, 2012). The artist's intention according to Shimamura (2013) is to create an artwork that communicates to the viewer thought-provoking ideas, emotional feelings, and sensory impressions. The beholder's sensation is the viewer's experience of the formal aspects of the artwork such as the line, color, and shape of objects (Shimamura, 2013). For instance, Georgia O'Keeffe's painting entitled *Music, Pink and Blue No. 2* produced in 1918 is an abstraction of colored music, and the synesthetic qualities of this artwork embody the artist's sentiment that "music could be translated into something for the eye" (Whitney Museum of American Art, 2017). This earlier artwork resembles O'Keeffe's other paintings such as *White Iris No. 7* (Museo Nacional Thyssen-Bornemisza, 2018) that portrays the beauty of flowers with soft petal lines, delectable subtle colors, and a fragrantly intoxicating essence that seems to invite the viewer to gaze longer. These paintings allow the viewer to enjoy the sensory qualities that nature provides such as the curved lines and bright popping colors that give the viewer a lasting impression.

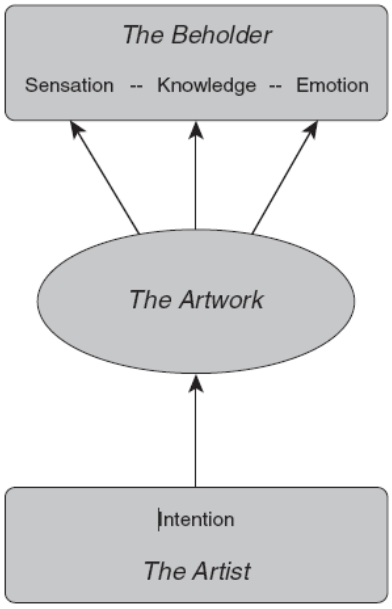

Figure 1. I-SKE Model. Adapted from *Experiencing art in the brain of the beholder* (p. 24), by A. P. Shimamura, 2013, New York, NY: Oxford University Press. Copyright 2013 by Oxford University Press.

The beholder's knowledge is the viewer's cognitive interest as well as conceptual understanding of the artwork's meaning. An example of deriving meaning from art due to cognitive interest would be the painting *Treachery of Images* by Rene Magritte with the phrase "This is not a pipe" written in French under the image of a smoking pipe (Los Angeles County Museum of Art, 2018). This artwork, similar to Duchamp's *Fountain* (TATE, 2018), stimulates the viewer's mind to figure out what the artist is communicating. In the case of Magritte's painting of a pipe, the artist is pointing out that the painting is in fact not a pipe, but merely pigments on a canvas surface to create the image of a pipe. Shankman et al. (1984) calls this form of art an interpretation of interpretation, because the viewer is having to interpret the artist's interpretation of a copied object since an actual pipe is not truly present. This type of mental

stimulation can produce a form of cognitive pleasure and hedonic reward for the beholder due to having the ability to figure out what the artist is trying to communicate (Leder et al., 2004).

The beholder's emotion is in essence the viewer's feeling towards the artwork. The Impressionist painters, such as Degas, Monet, and Renoir (The National Gallery, 2018), created artworks that awaken the viewer's sense of feeling. For instance, Claude Monet's painting *Water Lilies* evokes feelings of serenity and calmness (The Art Institute of Chicago, 2018). In contrast, Edgar Degas' painting of a *The Orchestra at the Opera* (Musee d'Orsay, 2006) is lively and exciting allowing the viewer to feel as if they are an instrumentalist in the orchestra with dancers performing in the background. With brush strokes that concentrate more on the emotion of the event, these paintings promote a change in mood for the viewer after beholding the image and allow the viewer to possibly experience the emotions that the artist felt and intended to capture.

The I-SKE model's central concept states that when the beholder's SKE states are all heighted to maximum levels from beholding an artwork there will be a profound aesthetic response (Shimamura, 2013). The present study examines the beholder's SKE to address the beholder's aesthetic experience. If all aspects of the beholder's SKE are heightened, the beholder may have a subsequently profound aesthetic experience according to the artist's intention. For the purposes of this study, a profound aesthetic experience is the fulfillment of the artist's intention (I), which happens after the beholder's SKE are stimulated and heightened. Thus, the I-SKE model is applied in the present study as SKE-I to give insight into the beholder's SKE aesthetic experience of a synesthetic dress as an artwork (see Figure 2).

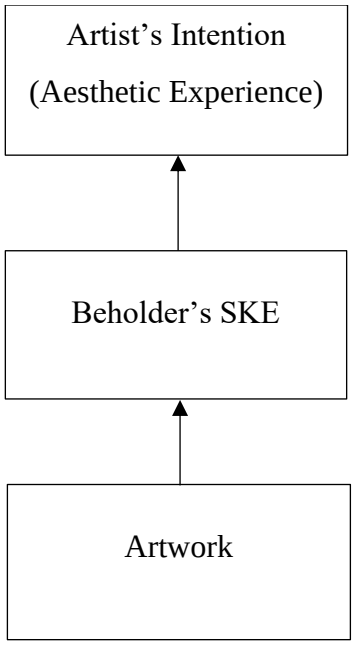

Figure 2. The SKE-I conceptual framework of the present research based on the Shimamura's (2013) I-SKE Model.

Multisensory properties of a synesthetic dress and synesthetic experience

Dress can stimulate the five senses from touch, sight, taste, smell, and hearing (Eicher & Sumberg, 1995; Pailes-Friedman, R. 2016). These multisensory responses can be prompted by the elements of design such as through the visual stimulation of color, drape, silhouette, and style of a dress (Fiore & Kimle, 1997). With the additional infusion of technology into a dress, such as colored LED lights and digital musical, synesthetic dresses have the capability to induce multisensory experiences resembling synesthesia. For instance, seeing sound and hearing colors is a state of synesthesia (Phillips, 2008), which can be replicated when an individual is exposed to a synesthetic dress that plays digital music while illuminating colored LED lights.

Individuals who involuntarily experience color when hearing music have a specific type of synesthesia called chromesthesia (Polzella & Hassen, 1997). For a person without chromesthesia, exposure to multisensory properties of colored-music from a synesthetic dress

may lead to a novel and exciting experience. Similar to a blind person experiencing color for the first time, a synesthetic dress allows the beholder to have an extraordinary multisensory experience of hearing colors and seeing sounds. This extraordinary experience of beholding a synesthetic dress may also be likened to a deaf individual experiencing orchestra music for the first time while wearing the *Sound Shirt* (Meyer, 2016).

As Francesca Rosella states, these types of multisensory designs give individuals "something that they have never felt before…It's not just about delivering the songs, but giving people an experience" (Pailes-Friedman, 2016, p. 122). This statement comes from a designer of several synesthetic designs including the LED light covered *Galaxy Dress* (CuteCircuit, 2018b), which is on display at the Museum of Science and Industry permanent collection in Chicago. Rosella also designed a costume for singer Laura Pausini that is nearly a 15-foot length dress illuminated with embedded LED lights that synchronize to the singer's music (Pailes-Friedman, 2016), which resembles the Cirque du Soleil *Volcano Dress* that visually represents a musical score from the show Delirium using fiber optics (Clement, 2009).

These multisensory dresses that merge music with colored LED lights resemble the designs shown at MODA in 2016 during the *On You* and *Beautiful Users* exhibition. For instance, the Imogen Heap *Mi.Mu Gloves* produce musical sound with lit sensors from hand gestures (Said-Moorhouse, Hussein, & Nurse, 2015; Warlick, 2016). *The Hood* acts similar to a guitar by playing sounds from lit-touch jacket sensors controlled with Bluetooth technology (Zeagler, Gilliland, Coleman, Starner, & Moore, 2015). In addition, a special appearance of the *Professor On Fire Shawl* at the exhibition opening revealed a shawl that pulsates light by responding to sound (Georgia Tech Wearable Computing Center, 2018). Each of these design

examples used the multisensory properties of sound with light to engage beholders to have a novel synesthetic experience.

Multisensory properties of a synesthetic dress and beholder's sensation

The beholder's sensation is the experience of the sensory qualities of an artwork (i.e., formal aspects of design) such as line, color, and shape (Shimamura, 2013). In the case of a synesthetic dress, multisensory properties of a dress such as silhouette (i.e., the shape of the dress) and silk-painted colors are merged with technological multisensory properties such as digital music and colored LED lights. These various sensory qualities of an artwork such as color and shape engage the beholder's five senses to stimulate sensory receptors to send signals such as pleasure to the brain (Fiore & Kimle, 1997).

According to Berlyne (1971), a moderate state of pleasure-arousal is sensed between the negative extremes of being either underwhelmed or overpowered so that the beholder experiences the ideal optimal aesthetic response (see Figure 3). Pleasurable experiences from multisensory artworks can lead to approach behaviors, prolonged gazing, and the impulse for touch to increased sensory input. This may be why there are typically signs in museum art galleries stating "do not touch" due to the desire to approach and explore through other senses (e.g., touch) a stimulating object to behold. An example of this type of stimulated sensory response is shared by Joy and Sherry (2003) who reported museum visitors stretched out their arms alongside a sculpture in order to understand the artwork. Furthermore, art museum visitors have also been found to take anywhere from a quick glance to an average time of 27.2 seconds in front of a stimulating and engaging artwork as a pleasure-based response (Smith & Smith 2001).

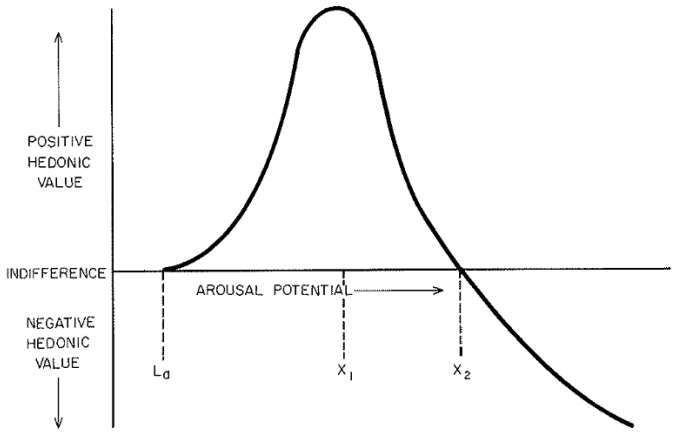

Figure 3. Berlyne's Wundt curve: Depicts moderate states of arousal and pleasure are ideal for optimal aesthetic experiences. Adapted from *Aesthetics and psychobiology* (p. 89), by D. E. Berlyne, 1971, New York, NY: Appleton-Century-Crofts. Copyright 1971 by Meredith Corporation.

Adversely, beholders' may sense that the artwork is unpleasant possibly due to underwhelming or overstimulating the senses, and therefore, they will avoid the aesthetic object by physically moving backwards or looking away. With the more sensory properties to behold in a synesthetic dress, it is uncertain which cues will instigate a pleasurable sensory experience. Since a synesthetic dress has the additional multisensory properties of digital music and colored LED lights, the beholder's senses may be overstimulated rather than moderately stimulated for a pleasurable sensation. Therefore, the following research question is posed for the present study:

***RQ1a*:** Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) sensation?

Multisensory properties of a synesthetic dress and beholder's knowledge

The beholder's knowledge is based upon memory and prior experience to find an artwork interesting enough to understand. For instance, Shimamura (2013) discussed how individuals enjoy artworks that are novel (i.e., atypical), but not too novel, since there needs to be some previous experiential knowledge to understand the object. This is probably because novelty peaks individuals' interests along with curiosity to figure out and make cognitive sense of an object based on prior knowledge. However, it may be frustrating for the beholder to try to understand something too new or unfamiliar.

Familiarity or fluency (i.e., the ease of processing an object due to prior knowledge) is the opposite of novelty, and preferences are generally given towards art that is easily processed over something new (Shimamura, 2013). Thus, greater familiarity with an object makes it more pleasant due to ease of processing (Silvia, 2012), and a positive aesthetic response should correspond to the ease in which an object is processed (Reber, Schwarz, & Winkielman, 2004). Therefore, there is a delicate balance of an artwork being ideally both slightly familiar as well as slightly novel. Thus, the artwork should not overly familiar to be boring, but not too new to be frustrating to figure out. In this way, the artwork is interesting while easy to process. These concepts are deeply rooted in Berlyne's (1971) work of investigating collative variables such as novelty and familiarity in relation to the maximum level of pleasure, which gives insight into the beholder's cognitive aesthetic pleasure received from an object or stimulus.

In relation to a synesthetic dress as an artwork, the multisensory properties of colored LED lighting and digital music in a dress may be more novel and not as familiar as an ordinary dress to the beholder's mind. Therefore, novelty mixed with curiosity may be important factors that museums consider when exhibiting synesthetic dresses for viewers to behold. Since the

beholder's knowledge reference may be based on isolated experiences with either fashion or technology, the beholder may need to integrate prior knowledge from memories and previous interactions with fashion as well as technology to understand the artwork. For instance, a memory of a smartphone vibrating, playing a song, and flashing a light when there is a phone call for the receiver may be influential knowledge when viewing a synesthetic dress as art. These previous beholder experiences bring knowledge of technology into the viewing and understanding of a synesthetic dress as an artwork.

For the purposes of this study, the beholder is not expected to know anything about the artist. However, there are other aspects of the beholder's pre-existing knowledge that can assist in aesthetically experiencing the artwork. For instance, the beholder's knowledge may be useful for assigning meaning to the artwork (Belke et al., 2006; Silvia et al., 2015) as well as for determining what the artwork conveys about art itself (Shimamura, 2013). According to Pailes-Friedman (2016, p. 9), technology-infused fashion can "challenge your idea of what fabrics and textiles are and inspire you to rethink what your clothing and other products made with textiles can do." Such inspirational thoughts may occur from beholding a synesthetic dress as an artwork and enhance the beholder's knowledge. Therefore, the following research question is proposed:

> ***RQ1b*:** Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) knowledge?

Multisensory properties of a synesthetic dress and beholder's emotion

Multisensory cues can evoke emotion (Bell & Ternus, 2012; Chatterjee, 2013). In particular, both music and color cues can prompt beholder's feelings. For instance, blues music

may appear as melancholy compared to exciting lively orchestra music. This is because music expresses emotions (Fiore & Kimle, 1997). Similarly, human emotions are connected to perceived colors (Shimamura, 2013). Therefore, different color temperatures may evoke certain moods. As an example, warm temperature colors (e.g., red) create more intense arousing emotional responses than calming cool temperature colors (e.g., blue; Fiore & Kimle, 1997).

The combination of color and music together can also impact beholder's emotions. According to the literature, emotion has a significant role in color responses to music. (Isbilen & Krumhansl, 2016; Palmer, Schloss, Xu, & Prado-León, 2013). For instance, Palmer et al. (2013) stated that participants felt faster music was associated with happy emotions along with lighter saturated colors such as yellow, whereas slower music was associated with sad emotions along with blue colors. Similar findings were reported by Isbilen and Krumhansl (2016) stating that stimuli (e.g., music) conveying negative emotions (e.g., sadness) were associated with darker desaturated colors than stimuli conveying positive emotions (e.g., happiness), which were associated with light saturated colors.

Since there are an abundance of emotions, Silvia (2012) and Desmet (2002) have categorized them in different ways. Silvia (2012) focuses on four main aesthetic emotion categories such as knowledge emotions (i.e., surprise, interest, or confusion), positive emotions (i.e., happy, content, satisfied), hostile emotions (i.e., anger disgust, offense), and self-conscious emotions (i.e., pride, shame, guilt and embarrassment). Conversely, Desmet (2002) has put emotions into categories of either pleasant (i.e., desire, pleasant surprise, inspiration, amusement, admiration, satisfaction, and fascination) and unpleasant (i.e., indignation, contempt, disgust, unpleasant surprise, dissatisfaction, disappointment, and boredom). For the purpose of this study,

Desmet's (2002) pleasant and unpleasant responses are primarily utilized to analyze emotional data due to the simplification of using two rather than four main categories of emotion.

These different emotions correspond to different facial expressions. For instance, smiling corresponds with joy, frowning with sadness or disappointment, and so forth. In a previous museum study, laughter, cross-eyed expressions, and a crinkled nose were recorded emotional reactions from an individual recounting their experience of viewing an artwork up close when they were a child (Joy & Sherry, 2003). Therefore, emotions corresponding to certain facial expressions can help reveal the beholder's emotional state towards the sensory cues of a synesthetic dress. Since beholder's emotions impact the aesthetic evaluation of an artwork, the present study examines the following research question:

> ***RQ1c*:** Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) emotion?

Multisensory properties of a synesthetic dress and aesthetic experience

A heightened aesthetic experience is the awe, pleasure, ecstasy, bliss point, and wow factor that arises from beholding an artwork that evokes the essence of an ideal (Carolan, 2015; Hagman, 2005; Shimamura, 2013; Silvia et al., 2015). For instance, multisensory cues may produce a "wow factor" similar to how synesthetes can visually "taste" an artwork. In this case, the bliss point may be best described as the savory enjoyment of colors as flavors. For example, the flavor of color, which Pantone (2008) understands well due to naming colors after foods (e.g., mimosa), enriches the palette of the viewer to experience art on another level of sensory perception. Therefore, the three-dimensional brush strokes of a painting become like cake

frosting to a synesthete and the delectable colors on canvas become bursts of flavor to be enjoyed by the senses. In this way, artworks can be aesthetically enjoyed as "deliciously yummy" rather than "disgusting" when it comes to the varying taste levels of art connoisseurs.

Similarly, a synesthetic dress's multisensory cues may provide the beholder with the exhilarating enjoyment of hearing colors and seeing sounds. This extreme delight in the artwork is the beholder's profound aesthetic experience. It is uncertain if the synesthetic dress alone will provide this profound experience or if the additional sensory cues will provide this experience. Therefore, the following research question is posed:

> ***RQ2*:** Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create a profound aesthetic experience for the beholder?

Beholder's SKE and aesthetic experience

According to Shimamura (2013), the beholder's elevated SKE states produce a "wow" moment. This "wow" moment is when the beholder's SKE shifts into a state of awe for a profound aesthetic experience (Silvia et al., 2015). When the beholder experiences this, there is an "Aha!" moment where the beholder feels a connection to the artwork. As Hegarty & O'Mahony (2001) describe it, there is the feeling of internal unity or insight into an artwork. Therefore, the beholder's aesthetic experience exemplifies that the artwork is enjoyable, pleasurable, and interesting with elevated SKE states rather than underwhelming or overpowering, causing the beholder's SKE states to lower.

Eisner (1988, p.17) states that "seeing requires sustained attention to the qualities of an object or situation; it is exploratory in character. Recognition is the act of assigning a label to an

object. Once assigned and classification has occurred, exploration ceases." This passage can apply to the aesthetic experience of art evaluation. Once exploration ceases in the senses, thoughts, and emotions, then the artwork can be deemed as aesthetically pleasing or not. For instance, Hagman (2005) refers to this aesthetic experience, in the context of a musical performance, as self-experience synchronized to music for profound enjoyment. By applying the I-SKE model to this example, self-experience is representative of the beholder's SKE, which may produce a profound aesthetic experience.

Focusing further on the context of this study, does the beholder's elevated SKE achieve a profound aesthetic experience for the beholder? Therefore, this research seeks to answer the following research question:

> ***RQ3:*** Which beholder's response through a) sensation, b) knowledge, and c) emotion results in a profound aesthetic experience?

Model

Based upon Shimamura's (2012) I-SKE model, this study proposes to use SKE-I framework to test the following relationships (see Figure 4).

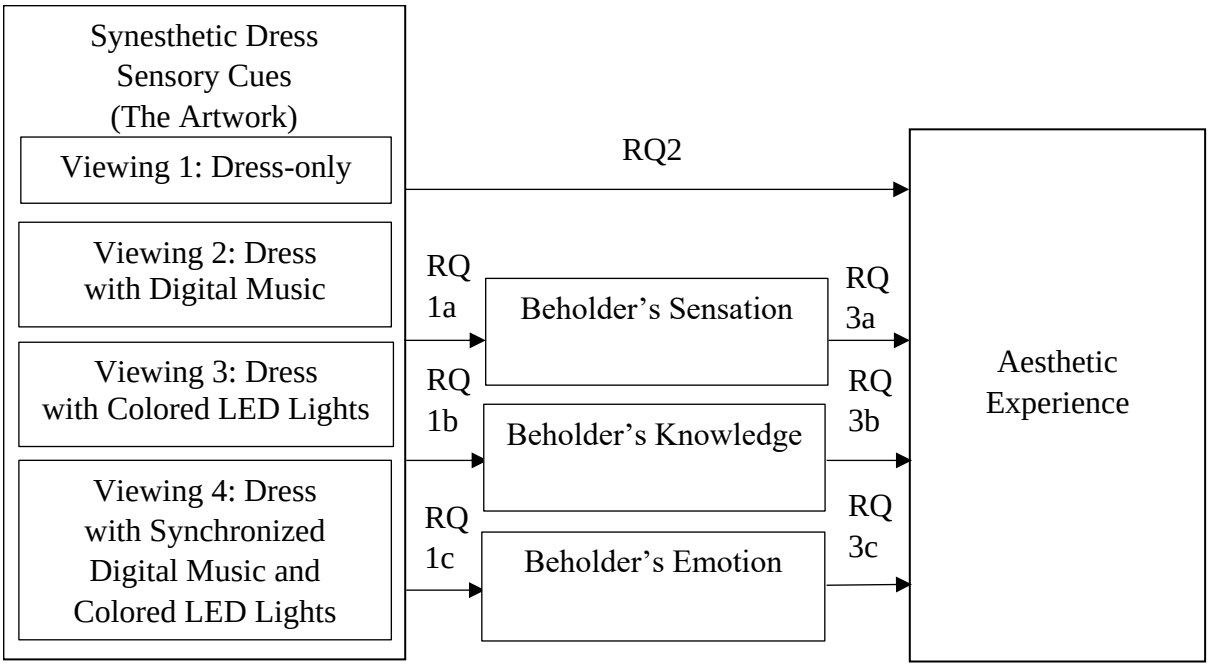

Figure 4. The conceptual framework of the present research. This model is based upon Shimamura's (2013) I-SKE Model.

CHAPTER 3. METHODOLOGY

This chapter discusses the research design along with stimuli development, sampling, data collection procedure, data collection instruments, measurement validity and reliability, and data analysis.

Research Design

By applying Shimamura's (2013) SKE-I model, this study used a mixed-methods grounded theory approach by gathering rich data for a deeper understanding of the phenomenon (Charmaz, 2006) through observations, physiological measures, and face-to-face interviews. This research was conducted at the Museum of Design Atlanta located in the Southeastern United States during the summer (see Appendix A). The qualitative interview data was used to assist in understanding the observational and physiological data that was obtain. For instance, observing someone cry can occur when someone is sad or in a state of awe when listening to music (Cotter, Silvia, & Fayn, 2018). Therefore, interview responses to questions such as "How did this dress make you feel?" provided significant insight into the meaning behind participants' observed reactions while viewing the artwork, such as whether they were joyful or critical while laughing.

Furthermore, physiological eye-tracking data, such as a prolonged gazing at certain places on the dress, were explained with the interview question "Where did your eyes focus longest on the dress as you looked? Why?" The participant's explanation as to why they focused on a particular area of a garment were very insightful since eye-tracking data only indicated where someone looked and for how long rather than why they looked. Therefore, the interview data helped to explain the meaning behind the data collected by eye-tracking glasses and skin sensors.

Overall, this research arose from a need to understand a social phenomenon of synesthetic garments appearing in museums for aesthetic enjoyment in a real-life context. Thus, this study was set up similar to a between-subjects experimental design to determine differences in museum visitors' aesthetic experiences from exposure to various ways to view the synesthetic dress (i.e., dress-only, music-only, lights-only, music-lights). However, this research cannot be deemed as experimental research due to the effects of independent variables on dependent variables not being tested. Furthermore, this study was structured similar to experimental research in terms of how viewings were structured, and subjects only experienced one viewing of the dress rather being exposed to all viewings.

Stimuli Development

The stimuli for the present study was a synesthetic dress that resembled a silk-painted kimono that illuminated colored LED lights while playing digital music. The synesthetic dress created by the researcher was an artwork for display in a museum resembling a shortened kimono that was silk painted with a wet-felted belt (see Figure 5). In addition, the researcher created a detachable belt using colored LED lights (enclosed in clear vinyl), which was programmed to display colors in the order that the song's musical notes played from the dress. Electronics for the dress (e.g., speakers, rechargeable batteries, and Raspberry Pi computer) were encased inside the back of the dress's belt and operated using Wifi technology. The dress was programmed electronically from a mobile or computer device to play digital music, colored LED lights, or both synchronously.

Figure 5. The Synesthetic Dress. This compilation of images depicts the back, front, side, and a detail image of the synesthetic dress from left to right.

The digital music that the dress played resembles the sound of soft chimes due to the song having been originally created using a musical punch card player with distinct music box sounds. These sounds were then converted digitally into piano sounds on UJAM online software (UJAM, 2017). This dress used flexible tape colored LED lights and was programmed with Microsoft Paint software to match the songs' sound frequency waves to the colored-light prism waves (e.g., musical note C major lights the LED the color green when played, musical note D major lights the LED the color blue, musical note E major lights the LED the color purple, musical note F major lights the LED a dark purple color, and musical note G lights the LED the color red; Dzurny, 2012).

Sampling

This research was approved through Auburn University's Institutional Review Board (see Appendix B). Millennial museum visitors ages 19 to 37 were recruited using a flier at the Museum of Design Atlanta (see Appendix C). A purposive sample of 44 millennial museum

visitors were observed, interviewed, and administered physiological measurement devices (i.e., eye-tracking glasses and skin sensors) to achieve data saturation (i.e., collecting additional data about a concept would not yield new insights; Charmaz, 2006; Schwandt, 2007). Grounded theory studies have used between 20 to 30 interviews, but a small sample can be deemed sufficient (Charmaz, 2006; Creswell, 2013). Similarly, Bojko (2013) discusses in detail the myth that 30 participants are ideal for eye-tracking studies and further states that qualitative research does not require a large sample. Actually, five participants are recommended for qualitative eye-tracking studies, because new information is rarely obtained beyond five participants (Nielsen, 2000). For the in-depth scope of this study, a minimum of ten participants per viewing between the four different viewings (i.e., dress-only, music-only, lights-only, music-lights) was desired for a sample of at least 40 participants. According to Bojko (2013), it is advantageous to have between five and ten percent more participants than the anticipated minimum. In this case, ten percent was one additional participant per viewing for a total of 44 participants for this study.

Although individuals of different genders, races, religions, income-levels, and occupations were indiscriminately preferred, age was a crucial factor for the present study. In particular, previous research suggests that millennials (born between the years of 1980 to 2000) have been more technologically-inclined compared to prior generations (Naumovska, 2017). As adults, millennials have had adequate time to become potential art-experts and did not require parental consent to participate in this study. Since the present research focused on synesthetic dresses that utilize technology, millennials were the target population to be sampled for the present study.

In addition, other sample characteristics that may have impacted the results of the overall study and were also surveyed included self-evaluated art expertise, audio-visually impairment,

and synesthesia. According to the Leder et al. (2004), individuals evaluate artwork differently according to their art expertise (e.g., art experts preferred complex stimuli whereas art novices preferred simplistic stimuli). Therefore, the sample characteristic of self-evaluated art expertise was accounted for in this study. Additionally, since the dress used audio-visual stimulation, it was important that individuals did not have audio-visual impairments that may have influenced their aesthetic experience of the artwork. It was also important to document whether individuals had synesthesia due to potential differences in aesthetically processing a synesthetic dress similar to how Isbilen and Krumhansl (2016) accounted for synesthetes (i.e., individuals with synesthesia) in their sample.

After consenting to participate in the study by reading as well as signing an informed consent letter (see Appendix D) and confirming millennial status using a questionnaire (see Appendix E), subjects answered questions such as “Are you a current museum member?,” “How would you describe your level of art expertise (skilled, intermediate, or beginner)?,” “Do you have any problems seeing?,” “Do you wear glasses?,” “Do you have any problems hearing?,” “Do you normally experience seeing colors when hearing music?,” “Do you normally experience hearing music when seeing colors?” These questions were used to screen participants before completing the study.

Data Collection Procedure

Before collecting data, a pilot study was conducted with two other researchers at a Southeastern university to ensure the clarity and effectiveness of the study while using physiological devices (i.e., skin sensors and eye-tracking glasses). During the main study, individuals that consented to participate and qualified to participate in this study based on their answers to the questionnaire (i.e., millennials who have no problem with vision or

hearing) were asked to wear eye-tracking glasses and a wrist skin sensor before viewing the synesthetic dress in a private foyer area gallery space. Depending on which one of the four days the participant came to the museum when the research was conducted over a timespan of two consecutive weekends (starting Sunday and concluding the following Friday, Saturday and Sunday with viewings from between 10 a.m. until 6 p.m.), the participant either saw the dress without digital music and color LED lights (viewing 1, dress-only), dress with digital music (viewing 2, music-only), dress with colored LED lights (viewing 3, lights-only), or dress with synchronized digital music and colored LED lights (viewing 4, music-lights).

Individually, participants were escorted one at a time to stand approximately six feet away from the dress designated by a floor marker. According to Short (2012), standing between four to six feet away from an artwork, depending on the size of the artwork, will provide a richer experience to viewing art in a gallery setting. Only one participant at a time could be in the foyer gallery area during the time of dress viewing and data recording. Each participant initially started out facing away from the dress with their back towards it and were instructed to remain in this position until the researcher instructed them to hit the wrist skin sensor button to start recording. Participants were also instructed that they could look at the garment at their leisure with no time limit and that they had the freedom to approach the dress by stepping closer to it after pressing the wrist skin sensor button to start recording.

In order to synchronize both the eye-tracking glasses video recording with the wrist sensor recording to know when the viewing time started and ended, participants were instructed to look directly at the wrist skin sensor through the eye-tracking glasses and hit their wrist sensor button for the first time to begin recording just before turning around to behold the artwork. Before each participant touched the wrist skin sensor button for the first

time, the artwork was unveiled from underneath a plain white cloth, and the researcher sat at a side peripheral vantage point to each participant as well as to the artwork in order to be poised to take observational data notes. Once situated for taking observational notes, the researcher then instructed each participant that they could hit the wrist skin sensor button for the first time to begin looking at the dress.

During the viewing time, the researcher took observational notes until the participant was done viewing the garment indicated by the participant looking through their eye-tracking glasses to hit the wrist skin sensor button a second time to stop recording, which synchronized the end of the recordings. The researcher then quickly covered up the artwork with the cloth that was on it before viewing so that future participants would not be pre-exposed to the artwork. The participants then removed the eye-tracking glasses and skin sensor after viewing the dress before sitting down to a brief interview. Each participant answered 13 interview questions from a pre-written interview script (see Appendix F). The interviews were both audio-recorded and written down to ensure participants' answers were accurately captured. The study took approximately 15 minutes to complete per participant.

Data Collection Instruments

Physiological measures for arousal were collected using Tobii Wearable eye-tracker glasses and a wrist skin sensor device (Empatica, 2018; Tobii, 2018). These particular devices were chosen over other physiological devices due their resemblance to everyday wearable accessories such as a wrist watch (e.g., Apple watch or Fitbit) and glasses (e.g., reading glasses or sun glasses) so that participants would feel as comfortable and natural as possible in the context of viewing art in a museum setting during the study. The eye-tracking glasses were used

to record eyes movement across the dress and the fixation durations for different areas of the dress.

According to Ohme et al. (2011), eye-tracking equipment measures eye movements that are short, rapid, and have quick stops known as saccades, or they can capture long stationary gazes called fixations to determine points of interest on the dress. The wrist skin sensors measure EDA also known as skin conductance or galvanic skin response, which indicates the participants' arousal based upon automatic nervous system responses such as sweat production (Ohme et al., 2011; Rajava, 2004).

Observational data was collected using a chart (see Table 1) that the research used to record data such as approach-avoidance behaviors (i.e., stepping closer or stepping away), tactile responses (e.g., reaching hand out to touch), facial expressions (e.g., smile, frown, etc.), and other miscellaneous observations that may have been encountered. The in-person interview was comprised of questions from Shimamura's (2013, p. 264) I-SKE model questions for artworks viewed at the museum (see Table 2) that were adapted to fit the present study using a synesthetic dress as the artwork (see Table 3).

Table 1

Observational Data Collection Chart

Participant #_____

Description	Comments			
Behavior	Dress	Music	Lights	All
Approach (move closer to artwork)	Y/N	Y/N	Y/N	Y/N
Avoid (move away from artwork)	Y/N	Y/N	Y/N	Y/N
Tactile response (reach towards the garment)	Y/N	Y/N	Y/N	Y/N
Facial Expression Frown, Smile, Straight-face, Laugh, Close-eyes				
Time observing dress (in seconds)				
Other (observation not listed above)				

Table 2

Original I-SKE Model Questions for the Museum

First Impressions: Look at the artwork. What's my initial response?
Intention
What do I know about the artist?
What is the historical period or social context?
What is the artist trying to communicate?
Sensation
What is driving the pictorial composition (balance, tension, shapes, colors)?
How is realism represented (linear perspective, shape from shading)?
Is there a grace or flow in the design (is there significant form)?
Where do my eyes move as I look?
Knowledge
What's the meaning or story behind the work?
Does it remind me of any prior experience or concepts?
Does it tell me something about art itself?
Do I find it interesting? Why?
Emotion
Does the artwork arouse me? Does it make me tense or relaxed?
What specific feelings are generated and how did the artist do this?
Do I like it or not? Why?

Note. Original questions are from page 264 of Shimamura, A. (2013). *Experiencing art: in the brain of the beholder*. New York, NY: Oxford University Press.

Table 3

Modifications to the Original I-SKE Model Questions for the Museum

Omitted Question: First Impressions: Look at the artwork. What's your initial response?
Added question: What was your first reaction to the dress?
Beholder's Sensation
Modified question: What was the most important part of the dress? Please explain.
Omitted question: How is realism represented (linear perspective, shape from shading)?
Modified question: Was there a graceful flow to the dress? Please explain.
Modified question: Where did your eyes focus longest on the dress as you looked? Why?
Beholder's Knowledge
Modified question: What do you think is the story behind the dress?
Modified question: What did the dress remind you of?
Modified question: What does the dress tell you about art itself?
Modified question: Did you find the dress interesting? Why?
Beholder's Emotion
Omitted question: Does the artwork arouse me? Does it make me tense or relaxed?
Modified question: How did this dress make you feel? Please explain.
Modified question: Did you like the dress or not? Why?
Artist's Intention (Beholder's Aesthetic Experience)
Omitted question: What do I know about the artist?
Omitted question: What is the historical period or social context?
Omitted question: What did the artist communicate to you?
Added question: Was the dress exciting to you or not? Please explain.
Added question: Did this dress impress you? Please explain.
Added question: Would you like to see more clothing like this in museums?

Note. Modified questions based on original questions are from page 264 of Shimamura, A. (2013). *Experiencing art: in the brain of the beholder*. New York, NY: Oxford University Press.

Measurement Validity and Reliability

A pilot study was conducted to check the clarity and effectiveness of the pre-study questionnaire, interview questions, observational chart, and physiological measurements. Furthermore, validity was ensured by using triangulation as a means of relying upon multiple sources of data (i.e., physiological measures, observations, and interview questions) for the results (Creswell & Miller, 2000). Triangulation ensured that what the researcher observed and what the physiological measures indicated corresponded to what the participants stated to have felt during the interview. For instance, if the participant was observed to have smiled, but stated that they felt sadness then their statement was not a valid response in correspondence to their joyful expression.

This study also used intercoder reliability to determine content analysis reliability to test the coding of interview passages, observational data, and physiological measures (Mouter, & Vonk Noordegraaf, 2012). Intercoder reliability was used to measure agreement between the principal investigative researcher and two other independent coders for applying codes to themes (Kurasaki, 2000). For instance, an interview passage may have been coded differently by each coder. Therefore, there needed to be consistency and agreement between coders to assign the same meaning to the data.

If there were inconsistencies in coding, all coding discrepancies were reported by the researcher using the percentage agreement of inter-rater reliability. Percentage of agreement has been determined to be efficient in comparison to using other reporting methods such as Krippendorff's Alpha coefficient, which assumes coders' qualifications are alike and all codes can be used equally as much (Campbell, Quincy, Osserman, & Pedersen, 2013) and Cohen's Kappa coefficient that has an unknown number of chance agreements (Kolbe & Burnett, 1991).

Data Analysis

After the data was collected (already separated from participant identification consent forms), the descriptive statistics were entered into an Excel file. Descriptive statistics (the mean scores and converted percentages) were calculated for pre-interview questions (i.e., demographics, etc.). Eye-tracking data was analyzed using Tobii Pro Studio. In Tobii Pro Studio, auto mapping of fixation points on the snapshot (see Figure 6) with designated dress areas of interest (AOIs) such as the belt, bottom of the dress, top of the dress or sleeves (shown in Figure 7) were manually cleaned by deleting fixation points that did not correspond with the dress. Then, absolute duration heat maps, gaze plots, and charts were created to indicate AOIs based on the duration of time as well as location of eye movement across the dress. Metrics specified for visualization of data generation included AOI total fixation duration (i.e., total time that each participant fixated on each area of interest) and AOI time to first fixation (i.e., the time to first fixation for each area of interest, which determines how rapidly areas of interest are noticed; Bojko, 2013).

Figure 6. Tobii Pro Studio Synesthetic Dress Snapshot.

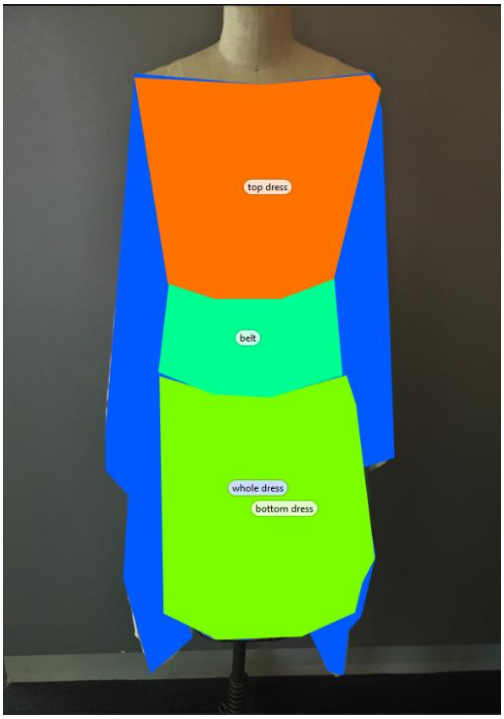

Figure 7. Synesthetic Dress AOIs designated for Tobii Pro Studio. Belt (turquoise), dress top (orange), dress bottom (green), and whole dress for calculating sleeves (blue) are depicted in the image.

Skin sensor data was download from the wrist sensor into E4connect software (Empatica, 2018). An Excel spreadsheet was created to label each participant's EDA. Then, each participant's beginning and end viewing times along with two minutes of baseline prior to viewing the dress were determined from the Excel EDA data file. After labeling the beginning view times, end view times, and baseline time in Excel, averages were calculated for the treatment EDA (i.e., data from the beginning to the end of the viewing time) and baseline EDA (data corresponding to two minutes prior to treatment viewing time). Afterwards, the percentage difference between the baseline EDA (i.e., before the treatment which was two minutes prior to viewing time) and after the treatment EDA (i.e., the garment viewing time indicated by the time the participant pressed the wrist sensor button once to start viewing until pressing the button twice to finish viewing) was determined using the following calculation: ((treatment-baseline)/baseline) x 100 = EDA. A positive value for EDA is indicated as an increase in sweat secretion (e.g., arousal), whereas a negative value is a decrease in sweat secretion (e.g., calm).

Observational data, physiological measurements, and interview data were analyzed using key words and phrases (i.e., meaningful analysis units). These meaningful analysis units were then put into a coding sheet, which was used to develop a coding scheme that assigned codes based on reoccurring themes (see Tables 4-5). Afterwards, a coding guide was formed to explain code category meanings (i.e., uniqueness and wearability in the dress aspects theme) used for intercoder reliability, then examples of how codes were applied to the interview data were developed after intercoder reliability was completed, and finally a code book for the five overarching code themes (i.e., dress aspects, beholder aspects, story aspects, emotion aspects, and museum aspects) was developed (see Tables 6-15). Codes were checked using Coding Analysis Toolkit (CAT, 2018) online interrater reliability software with transcribed data from the

participants' answers to each interview question. To check the reliability of each code that emerged from the data, the data was divided up between two sets of researchers for coding the extensive volume of qualitative interview data. Two researchers were assigned to code questions 1-4, 8, and 10-12 due to these questions sharing the same coding guides for dress aspects and beholder aspects themes in which the researchers had substantial knowledge especially of fashion, dress, and textiles. Furthermore, two other researchers were assigned questions 5-7, 9, and 13 to code using coding guides for story aspects, emotional aspects, and museum aspects themes. Data was coded, organized by themes, analyzed, and interpreted (Birkmann & Kvale, 2015).

Table 4

Example of Raw Interview Data for Q1

Interview Question 1: "What was your first reaction to the dress?"	
ID	Data
1	Looks very thin, don't think you'd be able to wear it in everyday life.
2	I noticed it was made out of unusual materials, like the plastic around the middle.
3	"Is this what I'm supposed to be what I'm looking at?"...noticing the pattern... colors

Table 5

Sample Coding Sheet for the Example of Raw Interview Data for Q1

ID	Units of Analysis (Shortest meaningful segments of text to code)	Code
1	Thin, wear it in life	
2	Made of unusual materials, plastic	
3	Supposed to…look at?, patterns, colors	

Table 6

Coding Guide for Dress Aspects Theme

Dress Aspects Codes	Definition
Uniqueness	What makes the dress one of a kind or unusual (i.e., hadn't seen something like it before, eye-catching, not what you expect, different, new/novel).
Wearability	Whether someone feels they would wear it or not.
Materials	The garments' composed elements (i.e., plastic, linen, silk)
Material weight	The thinness, delicateness, lightness, see-through, or transparent quality of the dress.
Print/Pattern	The design on the fabric (i.e., tie-dye, marble, hand-painted).
Color	The different hues in the fabric (i.e., pastel, watercolor, purple, red, blue, green, etc.).
Texture	The roughness or smoothness of the dress.
Drape	The way the dress falls, lays, or fits.
Music	The sound coming from the dress (i.e., chimes, rain, etc.).
Lights	The colored LED lights that give light to the dress.
Cut/Silhouette	The shape, cut, or construction of the dress (well-made).
Dress Location/Areas	The different sections of the dress (i.e., the belt, the midsection, the bodice, the sleeves, etc.).
Movement	The ways the dress changed (i.e., flowed, physically moved, patterns changed)

Note. Coding Guide for Interview Questions 1-4, 8, 10-12, and Additional Comments.

Table 7

Coding Guide for Beholder Aspects Theme

Beholder Aspects Codes	Definition
Person/Place/Thing/Time Association	Memories of things connected to the dress (i.e., elegant, summer time, concerts, Arwen from Lord of the Rings, castles, Celtic moor, butterfly, 1970s, hand vs. technology, etc.).
Personal Style	The individual's aesthetic or predisposition to like something
Visually Appealing/Liked	The individual's appreciation for the garment and approach behavior.
Interest/Intrigue	The individual's inquisitiveness or curiosity towards the dress, trying to understand it, and being thought-provoked.
No Reaction	The individual being unmoved in feeling or thought towards the dress.
Surprise/Excitement	The viewer experienced unexpectedness from the dress (i.e., not know what to expect).
Normal/Underwhelming	The dress not being extraordinary/ not exciting (i.e., simple)
Emotion/Feeling	The dress creates a mood change (i.e., calm, tranquil, peaceful, whimsical, fun)
Visual Uncertainty	The viewer was not sure what they are beholding (i.e., challenging).
Visually Unappealing/disliked	The individual didn't enjoy the dress design.

Note. Coding Guide for Interview Questions 1-4, 8, 10-12, and Additional Comments.

Table 8

Coding Example for Dress Aspects and Beholder Aspects Theme

Beholder Aspects Coding	Interview Data (Question 1)
Place Association Color, Cut/Silhouette Emotion	Ah, it was very ***gothic***. Kind of like an ***old castle***. Like the ***purple*** and the ***shape*** of it was kind of ***grim***…

Table 9

Coding Guide for Story Aspects Theme

Story Aspects Codes	Definition
Repurposed	Made from collected items to make something new.
Nature/Eco-friendly	Having to do with environmental issues and nature (i.e., ocean, butterfly, etc.)
Fashion	Focused on style, trends, and everyday clothing (i.e., kimono, fashion as art, etc.)
Time	Seasons, dates, decades (i.e., spring, summer, futuristic, 2040, 1970s).
Diverse/Diversity	differences such as dichotomies such as handmade vs. technology, broad, multi layered, various forms, random, three-dimensional.
Feminine	Regarding women (i.e., mom, girlfriends, grandmothers)
Costume	Dress-up garment to wear to an event, party, art opening, fashion event, concert, or in a movie to be character in like a fairytale or in scifi.
Emotion/Feeling	To create a specific feeling for an experience (i.e., joy, calm, tranquility)
Freedom	Liberation, free-spirited, or carefree (i.e., drum-circle, hippee, flower-child, bohemian)
Artistic	Beauty, elegant, graceful, painted, nice design, crafty, unique (i.e., iPhone X commercial, etc.)
Subjective	Open to interpretation, opinion, and thought of what people like.
Nothing	Don't know, nothing comes to mind, or there's no back story.

Note. Coding Guide for Interview Questions 5-7.

Table 10

Coding Example for Story Aspects Theme

Story Aspects Coding	Interview Data (Question 5)
Freedom Emotion Feminine Fashion Artistic	I would have to say, I see a lot of ***freedom***, ***liberation***, just very ***free-spirit***, or ***free-spirited***. I see ***joy*** and ***security***, ***positivity***, ***good vibes***, ***good energy***. If I saw a ***woman*** walking into a restaurant or something with that ***dress on*** I just feel like it would exude, like she would be very ***graceful***, and well ***poised***, and ***confident***. I could go on, but.

Table 11

Coding Guide for Emotion Aspects Theme

Emotion Aspects Codes	Definition
Calm	Peaceful, at ease, relaxing, or comforting
Happy	Feeling good, ready to have fun/party, light and airy feeling or having a positive mood.
Intrigued	Interested, curious, or thought-provoking.
Springtime	Feeling free or like it's a nice cool day
Surprised	Shocked, impressed, in awe, or thinking something is cool or wowed by something.
Neutral	No emotion or too familiar to be moved emotionally.
Sad	Tragic.
Weird	Confused, foggy, or uncomfortable (e.g., dissonance).

. *Note.* Coding Guide for Interview Question 9.

Table 12

Coding Example for Emotion Aspects Theme

Emotion Aspects Coding	Interview Data (Question 9)
Calm, Weird	It made me ***calm***, and feel a little ***weird***.

Table 13

Coding Guide for Museum Aspects Theme

Museum Aspects Codes	Definition
Historic clothing	Dress from the past (i.e., old, Moccasin dress)
Museum/Artist	Referencing specific galleries and artists they feature (i.e., SCAD, Guo Pei, the Met, the High).
Contemporary/futuristic fashion	Clothing worn today or in the future (i.e., modern)
Backstory	Having a topic, purpose, narrative, or explanation behind the artwork/dress
Artistic fashion	Clothing made for viewing as art, not as wearable clothing.

Note. Coding Guide for Interview Question 13.

Table 14

Coding Example for Museum Aspects Theme

Museum Aspects Coding	Interview Data (Question 13)
Contemporary Fashion, Museum/Artist	Ya, I mean I always think that, I mean, they did the ***sneakers*** at the ***High*** a couple of years ago, and I thought those were pretty neat.

Table 15

Code book for Code Themes

	Dress Aspects	Beholder Aspects	Story Aspects	Emotion Aspects	Museum Aspects
A priori/ Emergent	Emergent	Emergent	Emergent	A priori	Emergent
Sources	(Fiore, 2010; Edwards, 2017)	(Berlyne, 1971; Shimamura, 2013)	(Shimamura, 2013)	(Desmet, 2002; Silvia, 2012)	(Mida & Kim, 2015; Bolton 2016)
Operational Definition	Attributes of technology-enabled clothing that the viewer notices.	The viewer's reaction to the dress.	The viewer's associations to the dress.	The viewer's feelings towards the dress.	The viewer's perception of clothing exhibited in musuems.
Inclusions	Visual dress aesthetics (shape, color, etc.) and technology aesthetics (music and light)	Like/dislike, surprise, interested, uncertain, associations, personal style	Nature, time, fashion, art, costume, helping the environment, freedom, femininity, subjective, diverse, emotion	Calm, happy, intrigued, surprised, neutral, weird, sad, a spring (cool) day	Historic, contemporary, artistic, backstory, museum
Exclusions	Dress scent, physical touch of object	Skeptical, hyper	Masculinity, harming the environment, objectivity, simple, man-made	Afraid, angry	Retail, Wholesale

(continued)

Table 15 (Continued)

Code book for Code Themes

	Dress Aspects	Beholder Aspects	Story Aspects	Emotion Aspects	Museum Aspects
Exemplar Quote	"I think the color and the sound. Both the color of the lights and fabric… I was attracted to the colors"	"I thought it was beautiful, but I wasn't expecting it to be a dress!"	"60's 70's festival-wear…with kind of a modern-techno-vibe"	"It impressed me because of how relaxed it made me feel."	"I love seeing clothing in museums. Fashion is art."

To ensure that each research question was answered using the appropriate interview questions, the researcher used a chart to reference while analyzing the interview transcription data (see Table 16). Interview data was analyzed and reported using charts denoting coding scheme approaches such as descriptive coding for identified topics and emotion coding for identified emotions (Saldana, 2016). To ensure that each research question was answered using observational and physiological data, the researcher used a chart to reference (see Table 17). Observational data was reported using charts. Physiological, observational and interview data were cross-referenced to ensure triangulation where more than one method has confirming data results. Creswell (2013) and Berg and Lune (2012) were also be referenced to appropriately analyze and report the data results.

Table 16

Cross-referenced Interview Questions with Research Questions

Research Questions	Interview Questions that Answer RQs
RQ1a: Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) sensation?	1. What was your first reaction to the dress? 2. What was the most important part of the dress? Please explain. 3. Was there a graceful flow to the dress? Please explain. 4. Where did your eyes focus longest on the dress as you looked? Why?
RQ1b: Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) knowledge?	1. What was your first reaction to the dress? 5. What do you think is the story behind the dress? 6. What did the dress remind you of? 7. What does the dress tell you about art itself? 8. Did you find the dress interesting? Why?
RQ1c: Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) emotion?	1. What was your first reaction to the dress? 9. How did this dress make you feel? Please explain. 10. Did you like the dress or not? Why?
RQ2: Which sensory cues in a synesthetic dress create [digital music, colored LED lights, both, or none] a profound aesthetic experience for the beholder?	1. What was your first reaction to the dress? 11. Was this dress exciting or not? Please explain. 12. Did this dress impress you? Please explain. 13. Would you like to see more clothing like this in museums?

(continued)

Table 16 (continued)

Cross-referenced Interview Questions with Research Questions

Research Questions	Interview Questions that Answer RQs
RQ3a: Which beholder's response through sensation results in a profound aesthetic experience?	1. What was your first reaction to the dress? 2. What was the most important part of the dress? Please explain. 3. Was there a graceful flow to the dress? Please explain. 4. Where did your eyes focus longest on the dress as you looked? Why? 11. Was this dress exciting or not? Please explain. 12. Did this dress impress you? Please explain. 13. Would you like to see more clothing like this in museums?
RQ3b: Which beholder's response through knowledge results in a profound aesthetic experience?	1. What was your first reaction to the dress? 5. What do you think is the story behind the dress? 6. What did the dress remind you of? 7. What does the dress tell you about art itself? 8. Did you find the dress interesting? Why? 11. Was this dress exciting or not? Please explain. 12. Did this dress impress you? Please explain. 13. Would you like to see more clothing like this in museums?
RQ3c: Which beholder's response through emotion results in a profound aesthetic experience?	1. What was your first reaction to the dress? 9. How did this dress make you feel? Please explain. 10. Did you like the dress or not? Why?

(continued)

Table 16 (continued)

Cross-referenced Interview Questions with Research Questions

Research Questions	Interview Questions that Answer RQs
RQ3c: Which beholder's response through emotion results in a profound aesthetic experience?	11. Was this dress exciting or not? Please explain. 12. Did this dress impress you? Please explain. 13. Would you like to see more clothing like this in museums?

Table 17

Cross-referenced Observational-Physiological Data with Research Questions

Research Questions	Observations
RQ1a: Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) sensation?	• Approach-Avoidance • Tactile Response • Time Observing the Dress • Galvanic Skin Response/EDA
RQ1b: Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) knowledge?	• Time Observing the Dress
RQ1c: Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) emotion?	• Facial Expressions
RQ2: Which sensory cues in a synesthetic dress create [digital music, colored LED lights, both, or none] a profound aesthetic experience for the beholder?	• Facial Expressions • Approach-Avoidance • Tactile Response • Time Observing the Dress • Galvanic Skin Response/EDA

(continued)

Table 17 (Continued)

Cross-referenced Observational-Physiological Data with Research Questions

Research Questions	Observations
RQ3a: Which beholder's response through sensation results in a profound aesthetic experience?	• Approach-Avoidance • Tactile Response • Time Observing the Dress Galvanic Skin Response/EDA
RQ3b: Which beholder's response through knowledge results in a profound aesthetic experience?	• Time Observing the Dress
RQ3c: Which beholder's response through emotion results in a profound aesthetic experience?	• Facial Expressions

CHAPTER 4. RESULTS

This chapter discusses the results from using physiological devices, observational data collection, and interview data transcription. First, descriptive statistics were run on demographic information and observational data. Then, interview data was transcribed, coded for themes, and checked for intercoder reliability. Afterwards, EDA was calculated for each participant and heat maps, gaze plots, and charts were generated using eye-tracking data. Finally, all data was checked using triangulation and used to answer each research question.

Demographics

A total of 44 millennial museum visitors participated in this study totaling 11 participants per four different dress viewings (i.e., dress-only, music-only, lights-only, and music-lights). The average participant ranged from between 19 and 36 years of age with a mean age of 26.27, and the majority were female (61%) compared to male (39%). The ethnicity of participants was Caucasian/White (68%), African American/Black (14%), Asian (11%), Other (5%), and Hispanic (2%). Of these participants, many self-reported their level of art expertise as beginner (57%), whereas the rest were intermediate (25%), and skilled (8%). Only a few participants were current museum members (16%). The highest level of education was having a college degree (75%) followed by some college (23%) and high school diploma (2%). The annual income of participants ranged from less than $25,000 (43%), between $25,000 and $49,999 (23%), and $50,000 and above (34%).

Participants were screened to ensure that they could participate in this study. The following are results from those questions. To the question “do you have any problems seeing?” 93% of participants responded no and 7% responded yes. In response to the question “do you wear glasses?”, 70% of participants responded no and 30% responded yes. Participants who

wore contacts during the day of the study but reported having vision problems along with wearing glasses were still permitted to participate in the study. All participants reported not having any hearing problems. There were a few participants who reported normally experiencing seeing colors when hearing music (20%) and normally experiencing hearing music when seeing colors (9%). Due to different population characteristics during each viewing of the dress, demographics for each dress viewing are listed in Table 18.

Table 18

Sample Characteristics and Distributions of Different Viewings

Demographic Characteristics (N = 11 per viewing)	Viewing 1 (Dress-only) %	Viewing 2 (Music-only) %	Viewing 3 (Lights-only) %	Viewing 4 (Music-Lights) %
Mean Age	25.18	27.72	26.09	26.09
Gender				
Male	27	55	27	45
Female	73	45	73	55
Ethnicity				
White	73	64	73	64
Black	9	27	18	0
Hispanic	9	0	0	0
Asian	9	9	9	18
Other	0	0	0	18
Education				
High school diploma	0	0	0	9
Some college	18	18	36	18
College degree	82	82	64	73
Annual Income				
<$25,000	55	27	36	55
$25,000-$49,000	18	18	18	36
$50,000 or more	27	55	46	9

(continued)

Table 18 (continued)

Sample Characteristics and Distributions of Different Dress Viewings

Demographic Characteristics (N = 11 per viewing)	Viewing 1 (Dress-only) %	Viewing 2 (Music-only) %	Viewing 3 (Lights-only) %	Viewing 4 (Music-Lights) %
Museum Member				
Yes	18	9	36	0
No	82	91	64	100
Art Expertise				
Skilled	0	9	55	9
Intermediate	27	27	18	27
Beginner	73	64	27	64
Problems Seeing				
Yes	0	0	0	27
No	100	100	100	73
Wear glasses				
Yes	27	36	18	36
No	73	64	82	64
Problems Hearing				
Yes	0	0	0	0
No	100	100	100	100
See colors with music				
Yes	9	27	27	18
No	91	73	73	82
Hear music with colors				
Yes	0	9	18	9
No	100	91	82	91

Eye-Tracking Glasses

The heat maps created from data collected using the eye-tracking glasses indicated regions of greatest attention and fixation. For instance, the absolute duration heat map of the synesthetic dress for all 44 participants combined (see Figure 8) shows that there was a significant amount of interest and attention given to the middle belt area of the synesthetic dress due to the red areas denoting “heat” generated at that particular interest point on the dress.

Furthermore, there was some interest given to the yellow-green areas of the dress which include the center-front of the garment and the sleeves, along with hem and neckline.

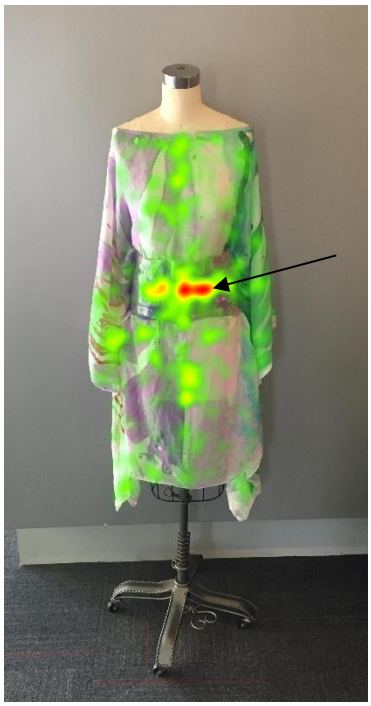

Figure 8. Absolute Duration Heat Map for 44 Participants.

A comparison of heat maps for each viewing of the dress can be found in Figure 9. In a comparison between the four different viewings, the heat maps show the different areas of interest for participants depending on their particular viewing of the dress (i.e., dress-only, music-only, lights-only, and music-lights). Participants who viewed the dress-only (viewing 1) showed the most interest in the belt area. Other areas of interest for this group of participants included the center-front, sleeves, and hem. For viewing 2 (music-only), participants seemed to have an interest in the overall dress as indicated by the randomly distributed fixations. Points of most fixation for the music-only participants included the top of the dress at center-front and on the belt. Viewing 3 (lights-only) and viewing 4 (music-lights) seemed to have a similar heat map

pattern where the most attention was given to the belt, but there were a few areas of interest on the top, bottom, sleeves, and hems of the dress.

These two viewings also seemed to have the least number of scattered fixations with overall general interest attributed to the belt. These images are referenced and compared later in the interview data section regarding participants' responses to the questions, "What was the most important part of the dress? Please explain" and "Where did your eyes focus longest on the dress as you looked? Why?" in order to achieve validity through triangulation.

Figure 9. Absolute Duration Heat Map for 11 Participants during Different Viewings. Viewing 1 (dress-only), viewing 2 (music-only), viewing 3 (lights-only), and viewing 4 (music-lights) are shown from left to right.

During AOI total fixation duration, participants during viewing 3 (lights-only) and viewing 4 (music-lights) looked at the belt more than any other viewings possibly due to the colored LED lights drawing the eye, whereas the belt was looked at least during viewing 2 (music-only). The music-only cue mainly raised viewer focus towards the top of the dress since this group of participants looked least at the belt, dress bottom, sleeves, and whole dress. Since participants viewed the overall dress the least with only the digital music cue, the absence of

colored LED lights synchronized to the music may have disrupted the overall flow of viewing the dress as a whole.

Interestingly, the top of the dress was looked at the most without the colored LED lights during both viewing 1 (dress-only) and viewing 2 (music-only), whereas the top of the dress was looked at the least with the colored LED lights (during viewings 3 and 4). This is possibly due to the attraction of light to the belt portion of the dress compared to the top of the dress. In particular, viewing 1 (dress-only with no additional sensory cues of digital music or colored LED lights) overwhelmingly had the most viewing time for the dress bottom, dress top, sleeves, and whole dress more than any other viewings of the dress. The averages for AOI total fixation duration can be found below in Table 19 along with AOI total fixation duration statistics for all viewings in Table 20.

Table 19

AOI Total Fixation Duration Averages in Seconds for Viewings 1-4

Viewing	Belt	Dress Bottom	Dress Top	Sleeves*	Whole Dress
Dress-only (1)	6.58	7.33	6.31	7.55	27.78
Music-only (2)	2.44	4.87	5.65	3.09	16.06
Lights-only (3)	7.29	6.36	4.66	4.01	22.32
Music-lights (4)	8.82	7.02	4.82	4.04	24.70
Average	6.28	6.40	5.36	4.67	22.71

***Sleeves are a calculated metric.*

Table 20

AOI Total Fixation Duration Statistics for All Viewings

All Viewings	Belt	Dress Bottom	Dress Top	Whole Dress
Average	6.28	6.40	5.36	22.71
Share of Total Time	15.42	15.69	13.16	55.73
Percentage Fixated	97.73	100.00	97.73	100.00
Variance	40.81	28.57	14.38	248.52
Standard Deviation (n-1)	6.39	5.34	3.79	15.76

Most participants' quickest first fixation typically occurred at the dress top except for during the music-lights viewing where the belt was fixated on first. It took the shortest amount of time (0.20 seconds) to first fixate at the belt during viewing 4 (music-lights) and the second shortest amount of time (1.42 seconds) during viewing 3 (lights-only) probably due to the LED lights. Conversely, it took the longest amount of time (2.70 seconds) for participants to initially look at the belt during viewing 2 (music-only). Viewing 1 (dress-only) had the shortest amount of time (1.46 seconds) for participants to start viewing the dress bottom, whereas viewing 3 (lights-only) took the longest amount of time (2.05 seconds). Finally, the top of the dress was quickly fixated on during viewing 2 (music-only) compared to all other viewings. It took the longest time for participants to eventually view the dress top during viewing 4 (music-lights) due to 2.41 seconds elapsing until first fixation as seen in Table 21 labelled AOI time to first fixation.

Table 21

AOI Time to First Fixation Averages in Seconds for Viewings 1-4

Viewing	Belt	Dress Bottom	Dress Top
Dress-only (1)	2.17	1.46	1.43
Music-only (2)	2.70	1.70	0.18
Lights-only (3)	1.42	2.05	1.09
Music-lights (4)	0.20	1.92	2.41
Average	1.66	1.78	1.31
Standard Deviation	3.16	2.39	2.50

*****_Whole dress not measurable for time to first fixation._

Skin Sensors

Graphs and tables were created from skin sensor data to indicate participants' EDA when viewing the dress. During viewing 1 (dress-only), three participants' EDA levels were unrecordable by the skin sensor. Therefore, eight participants' EDA levels were reported.

Similarly, the last participant's EDA levels were unrecordable by the skin sensor during viewing 2 (music-only) so only ten participants' EDA levels were reported. EDA levels for participants during viewing 3 (lights-only) and viewing 4 (music-lights) were all recorded by the skin sensor.

The majority of participants during viewing 1 (dress-only) had an overall increase in EDA where their increased sweat production indicated that they were more aroused while viewing the dress than before viewing (see Figure 10 and Table 22). There were however two participants during the dress-only viewing that had a decrease in EDA, whereby they were not aroused which was confirmed according to the interview data. For instance, participant 4 had an extreme decrease in EDA stating they did not want to wear the disliked "tie-dye" pattern, and participant 37 had a slight decrease in EDA stating the artwork was not a painting as expected.

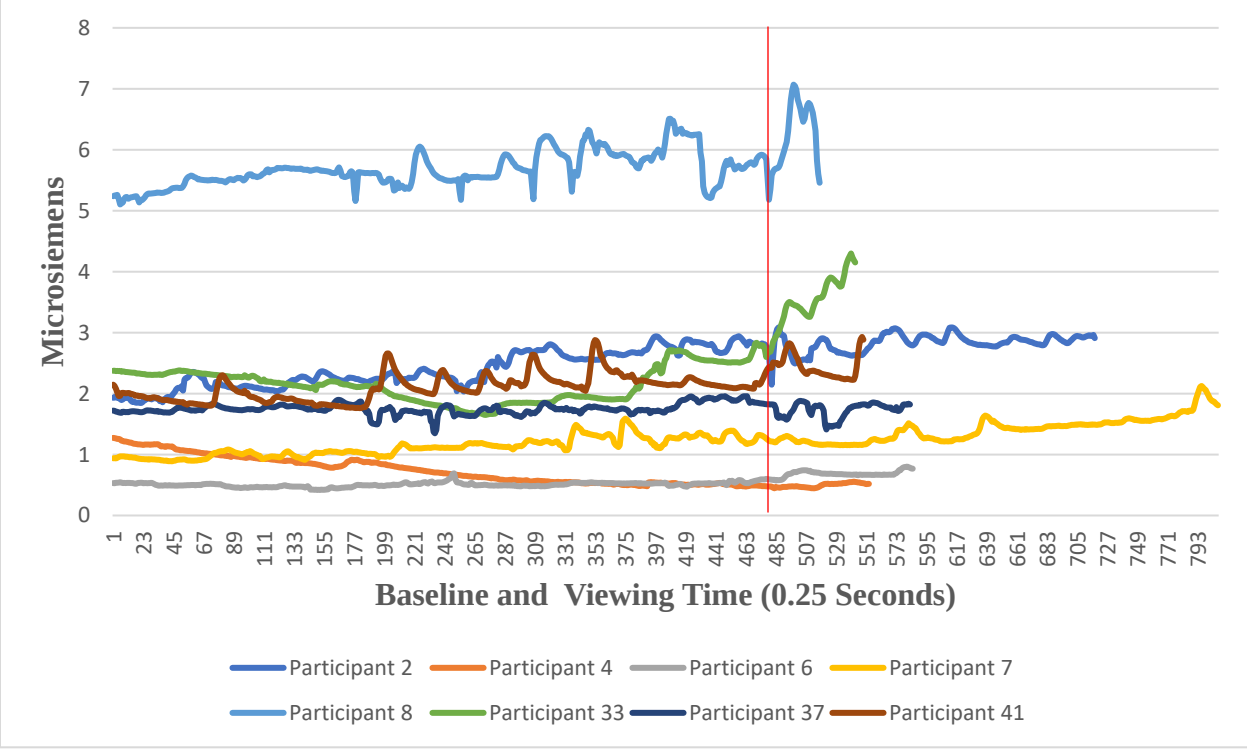

Figure 10. Viewing 1 EDA. Electrodermal Activity (EDA) reported in microsiemens (unit of electric conductance) for eight participants during viewing 1 (dress-only). Baseline is before the vertical red line and viewing time is after the vertical red line.

Table 22

Viewing 1 (Dress-only) Participants' Average Baseline EDA, Average Treatment EDA, and Percent Difference

Viewing 1 Participant #	Average Baseline EDA µS	Average Treatment EDA µS	Percent Different/Change %
2	2.39	2.83	18.55
4	0.75	0.49	-34.15
6	0.51	0.68	34.41
7	1.12	1.42	26.58
8	5.67	6.22	9.65
33	2.15	3.49	62.33
37	1.75	1.74	-0.98
41	2.09	2.43	16.33

Note. Microsiemens (µS) equals 1 micromho (µmho) as a unit of electric conductance (Omega, 2018).

Participants during viewing 2 (music-only) experienced the most overall positive percent change in EDA and were aroused most during viewing the dress as seen in Figure 11 and Table 23. During this viewing, there were no participants that had a decrease in sweat production. Therefore, they were all aroused during viewing the dress with digital music. Most participants during this viewing stated in the interview data that they enjoyed the colors and were surprised it was a dress.

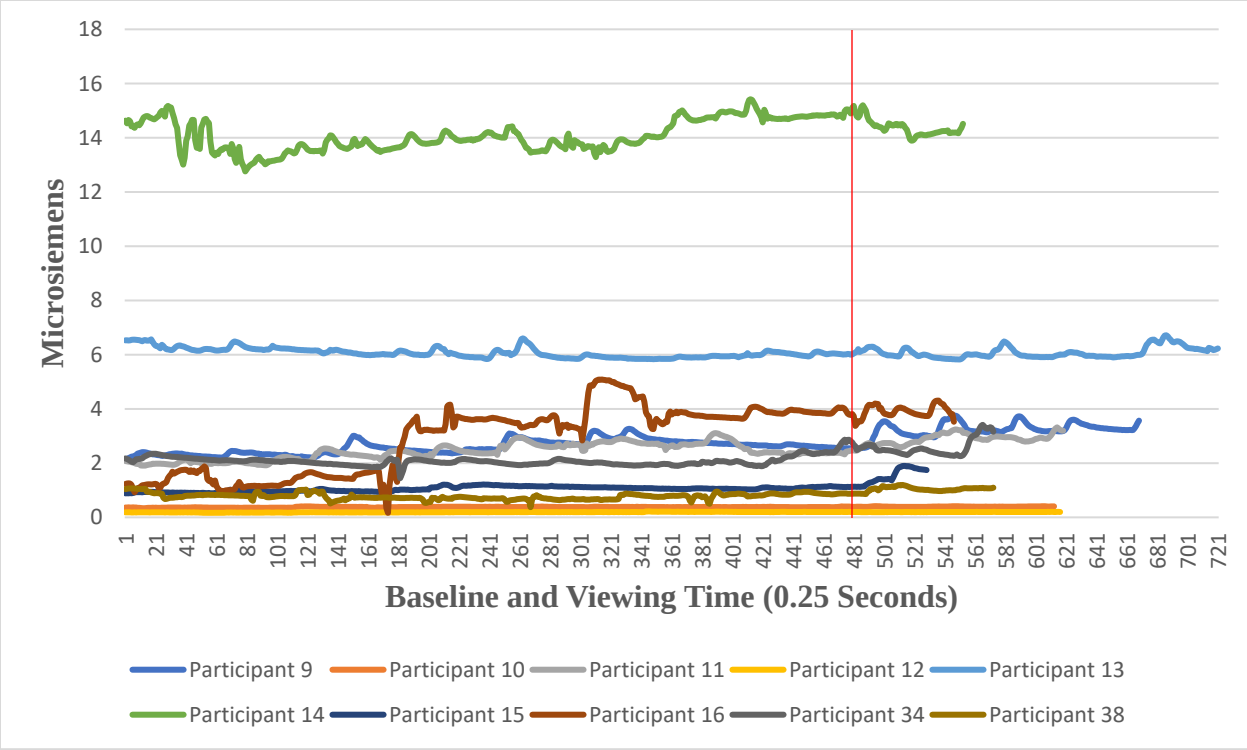

Figure 11. Viewing 2 EDA. Electrodermal Activity (EDA) reported in microsiemens for ten participants during viewing 2 (music-only). Baseline is before the vertical red line and viewing time is after the vertical red line.

Table 23

Viewing 2 (Music-only) Participants' Average Baseline EDA, Average Treatment EDA, and Percent Difference

Viewing 2 Participant #	Average Baseline EDA µS	Average Treatment EDA µS	Percent Different/Change %
9	2.59	3.24	25.36
10	0.38	0.40	5.14
11	2.41	2.89	19.84
12	0.19	0.20	3.40
13	6.07	6.08	0.17
14	14.09	14.37	1.99
15	1.04	1.52	45.94
16	2.88	3.91	35.96
34	2.08	2.58	24.00
38	0.78	1.04	34.12

Note. Microsiemens (µS) equals 1 micromho (µmho) as a unit of electric conductance (Omega, 2018).

Participants who viewed the dress with colored LED lights during viewing 3 had the lowest EDA. Four of the participants had a decrease in EDA as seen in Figure 12 and Table 24. This indicates a decline in arousal with only the colored LED lights displayed. In examining the interview data, these four participants stated sentiments of their having unmet expectations (i.e., not expecting a dress), the lights being intense, and the colors being loud and unorganized.

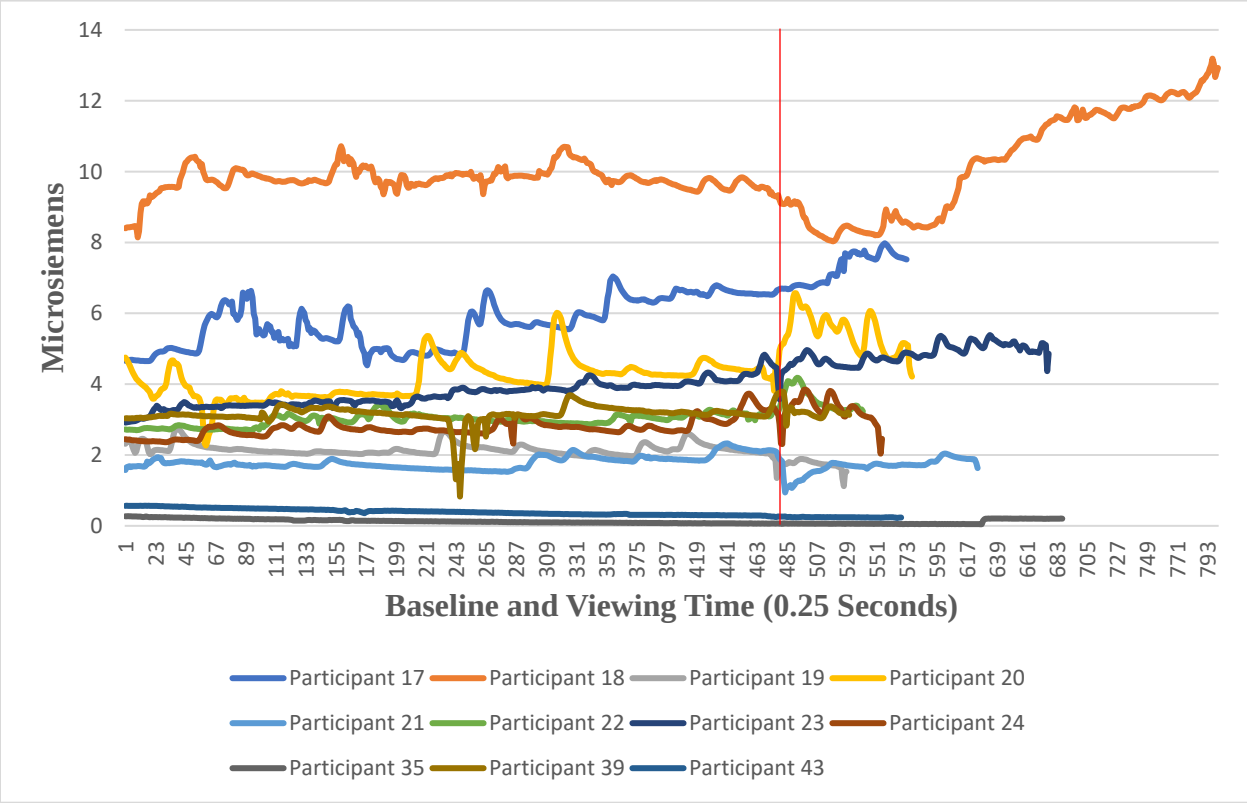

Figure 12. Viewing 3 EDA. Electrodermal Activity (EDA) reported in microsiemens for eleven participants during viewing 3 (lights-only). Baseline is before the vertical red line and viewing time is after the vertical red line.

Table 24

Viewing 3 (Lights-only) Participants' Average Baseline EDA, Average Treatment EDA, and Percent Difference

Viewing 3 Participant #	Average Baseline EDA µS	Average Treatment EDA µS	Percent Different/Change %
17	5.72	7.28	27.19
18	9.78	10.28	5.07
19	2.16	1.74	-19.25
20	4.13	5.46	32.17
21	1.80	1.68	-6.41
22	2.99	3.56	19.34
23	3.71	4.85	30.84
24	2.77	3.28	18.62
35	0.13	0.10	-27.40
39	3.15	3.23	2.64
43	0.40	0.24	-39.22

Note. Microsiemens (µS) equals 1 micromho (µmho) as a unit of electric conductance (Omega, 2018).

Participants who viewed the dress with both music and lights (viewing 4) had an overall increase in EDA meaning that they were overall aroused. There was only one participant (i.e., participant 25) which had a subtle decrease in EDA (see Figure 13 and Table 25). This particular participant had mentioned having unmet expectations (i.e., not expecting a dress) and feeling the dress evoked a feeling of tragedy according to the interview data.

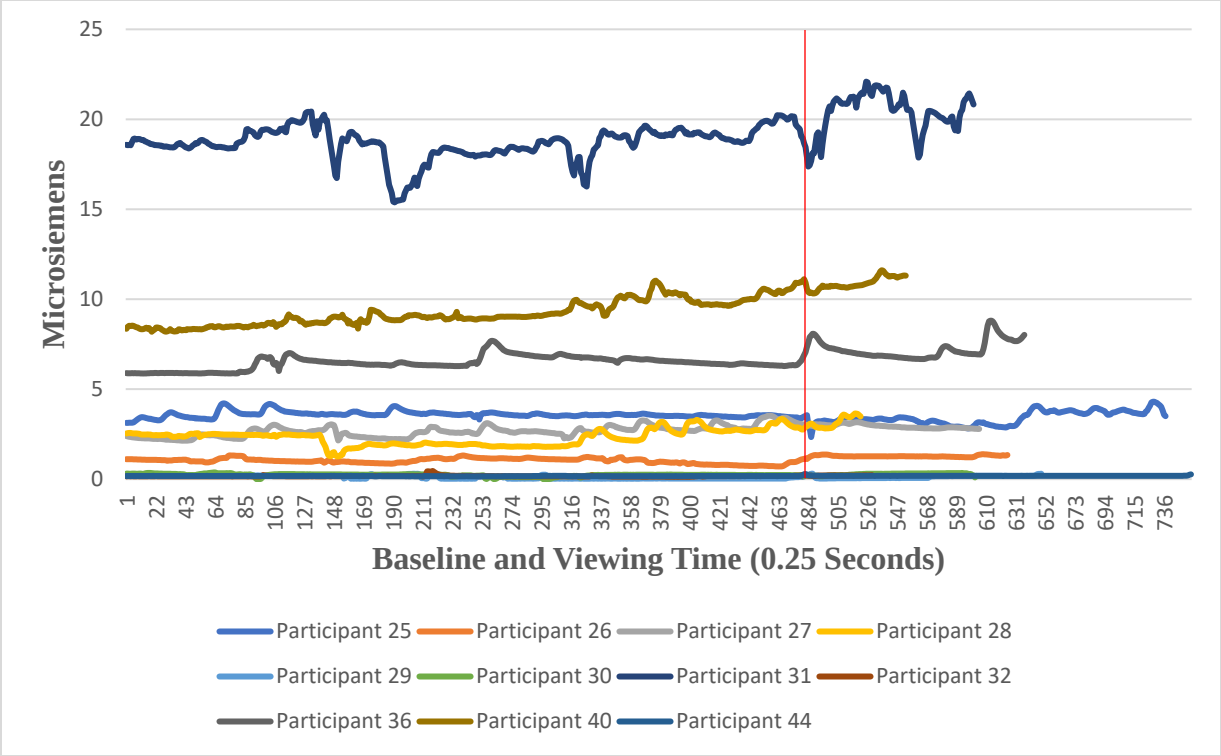

Figure 13. Viewing 4 EDA. Electrodermal Activity (EDA) reported in microsiemens for eleven participants during viewing 4 (music-lights). Baseline is before the vertical red line and viewing time is after the vertical red line.

Table 25

Viewing 4 (Music-Lights) Participants' Average Baseline EDA, Average Treatment EDA, and Percent Difference

Viewing 4 Participant #	Average Baseline EDA µS	Average Treatment EDA µS	Percent Different/Change %
25	3.59	3.42	-4.69
26	1.02	1.28	25.43
27	2.66	2.94	10.55
28	2.31	3.15	36.70
29	0.12	0.12	5.32
30	0.23	0.28	21.21
31	18.68	20.37	9.01
32	0.17	0.20	20.41
36	6.46	7.23	11.91
40	9.22	10.89	18.15
44	0.17	0.18	7.82

Note. Microsiemens (µS) equals 1 micromho (µmho) as a unit of electric conductance (Omega, 2018).

Overall, participants were the most aroused during viewing 2 (music-only) as seen in Table 26. Participants were the least aroused during viewing 3 (lights-only). During viewing 1 (dress-only) and viewing 4 (music-lights), participants were aroused but not nearly as aroused as participants during viewing 2 (music-only).

Table 26

Electrodermal Activity for Viewings 1-4

Viewing	Electrodermal Activity Mean in Microsiemens	Standard Deviation σ
Dress-only (1)	16.59	27.89
Music-only (2)	19.59	16.28
Lights-only (3)	3.96	24.51
Music-lights (4)	14.71	11.20

Observations

According to the observational data, the most approach responses were during viewing 3 (lights-only) and the least amount of approaches was during viewing 2 (music-only). During each viewing, there were no avoidance responses. Furthermore, the only viewing that had a tactile response where someone reached out their hand to touch the garment was during viewing 2 (music-only). These approach-avoidance and tactile response behaviors are shown in Table 27.

Table 27

Observational Data of Approach-Avoidance and Tactile Response Behaviors for Viewings 1-4

Observations (N = 11 per viewing)	Viewing 1 (Dress-only) %	Viewing 2 (Music-only) %	Viewing 3 (Lights-only) %	Viewing 4 (Music-Lights) %
Approach				
Yes	36	18	64	27
No	64	82	36	73
Avoid				
Yes	0	0	0	0
No	100	100	100	100
Tactile Response				
Yes	0	9	0	0
No	100	91	100	100

The average viewing time of participants was much greater for viewing 1 (dress-only) at 41.97 seconds compared to any of the other viewings. The least amount of viewing time occurred during viewing 2 (music-only). The results for each participant's viewing time and the average viewing time for each viewing can be found in Table 28.

Table 28

Observational Data of Participants' Viewing Time and Average in Seconds for Viewings 1-4

Participant 1-11 per viewing and total average	Viewing 1 (Dress-only) seconds	Viewing 2 (Music-only) seconds	Viewing 3 (Lights-only) seconds	Viewing 4 (Music-Lights) seconds
Participant 1	23.54	45	21.01	60.15
Participant 2	61.25	32.19	79.33	35.18
Participant 3	52.3	34	11.44	45.42
Participant 4	19.36	32	33.4	9.77
Participant 5	128.32	56.85	33.38	39.37
Participant 6	26.76	15.58	15.15	29.75
Participant 7	85.56	10.28	47.58	27.51
Participant 8	7	13.52	16.28	11.18
Participant 9	14.98	21.58	50.26	36.3
Participant 10	26.23	21.03	11.28	16. 92
Participant 11	16.45	9.46	20.68	67.37
Average viewing time	41.97	26.49	30.89	36.20

Participants showed the greatest diversity of facial expressions during viewing 2 (music-only) and viewing 3 (lights-only). For instance, the dress with digital music (viewing 2) was the only viewing with participants who raised their eye brows and pressed their lips together. Similarly, viewing 3 (lights-only) was the sole viewing to provoke a participant to laugh. Conversely, viewing 1 (dress-only) and viewing 4 (music-lights) had a majority of straight-faced expressions mixed with some smiles. The facial expression observations are shown in Table 29.

Table 29

Observational Data of Participant Facial Expression Averages for Viewings 1-4

Observations (N = 11 per viewing)	Viewing 1 (Dress-only) %	Viewing 2 (Music-only) %	Viewing 3 (Lights-only) %	Viewing 4 (Music-Lights) %
Facial Expressions				
Straight-faced	73	55	55	82
Smile	36	36	55	36
Slight frown	9	9	9	0
Raised eye-brows	0	9	0	0
Squint	0	0	9	0
Pressed lips	0	18	0	0
Laugh	0	0	9	0

Additionally, miscellaneous observations were collected from participants reactions to the dress. For instance, participants who viewed the dress-only (viewing 1) were observed doing the following:

- Said that the dress was “rather nifty” before bending over then saying “cool”
- Peering forward while looking up and down
- Moving side to side
- Saying “hum” at first
- Putting hands on hips and saying “ok”
- Tilting head from side to side

Participants who viewed the dress with digital music (viewing 2) were observed saying the following:

- "Ah, now I get what you're trying to get out of this experience, where I look first, how much do I look, how much time do I take, question at the end regarding the colors.”
- "This the technology one? What's technological about it?"

- "Ok, cool. Nice."
- "It's really pretty" and "I like it."

Observations of participants viewing the dress with colored LED lights (viewing 3) were observed doing the following:

- Swaying from side to side
- Saying “Oh, pretty!”
- Nodding head up and down

Lastly, participants viewing the dress with synchronized digital music and colored LED lights (viewing 4) were observed as follows:

- Nodding twice
- Saying “It’s very pretty!”
- "Oh, that's cool. What! Is this like LED clothing stuff? Oh dang. Those are cool though. I've seen something similar to this like online on videos. So alright, I'm good."

Interviews

Different interview questions were coded according to different themes. For instance, interview questions 1-4, 8, and 10-12 were coded according to the following themes: dress aspects and beholder aspects. Interview questions 5-7 were coded according to the story aspect theme, question 9 was coded according to the emotion aspects theme, and question 13 was coded according to the museum aspects theme. Initially, the interview data was coded by the principal investigative researcher and then coded by two other researchers assigned to each interview question. These codes were then “quantized” by turning the codes into numeric values to understand how important a code is by its increased use, which according to Saldana (2016,

p.26) is best applied to a study that uses “content analytic studies, mixed methods studies, and field experiments” such as the present study. The results from coding the interview questions are as follows:

- Interview Question 1 (coded under the dress aspects and beholder aspects theme) was “What was your first reaction to the dress?”

For viewing 1 (dress-only), the coding results for the first interview question are located in Table 30. The results confirm that participants reacted first to the color of the dress while viewing the dress-only. Participants’ reactions to color included statements referencing specific colors such as “it was very nice, very polished, had the color blue in it which I like” and “I thought it was interesting. Purple's my favorite color so I was looking a lot at the middle purple section.” Some of the participants mentioned how the dress reminded them of watercolor by stating “I liked the colors on it, and I liked the way that they looked kind of like watercolors,” “I felt like it was very colorful and kind of like watercolor,” and “I was really interested in all the like details with the watercolor.”

Table 30

Coding for Viewing 1 (Dress-only) Participant Responses to Interview Q1

Code	*f*	% Total Coding	% Coder Agreement
Color	18	24	94
Print/Pattern	10	13.33	67
Visually Appealing/Liked	8	10.67	89
Wearability	8	10.67	67
Interest/Intrigue	7	9.33	78
Surprise/Excitement	5	6.67	83
Visual Uncertainty	5	6.67	83
Dress Location/Area	4	5.33	67
Personal Style	4	5.33	67
Materials Weight	3	4	100
Material	3	4	50
Visually Unappealing/ Dislike	2	2.67	67

Coding for participants answering the first interview question while viewing the dress with digital music (viewing 2) reported similarly to the dress-only (viewing 1) participants that their first reaction was primarily towards the color of the dress as shown in Table 31. Participants during viewing 2 (music-only) spoke the most of color by stating “it was colorful,” “purple,” and “I thought it was colorful. Ya, the various colors were nice.” Other statements regarding color included “I thought it was bright, colorful, visual appealing,” “I was intrigued by the colors,” and “there was a lot of colors in it. I just noticed the different colors.”

Table 31

Coding for Viewing 2 (Music-only) Participant Responses to Interview Q1

Code	*f*	% Total Coding	% Coder Agreement
Color	24	38.71	100
Visually Appealing/Liked	7	11.29	58
Surprise/Excitement	5	8.06	56
Dress Location/Area	3	4.84	100
Association	3	4.84	100
Texture	3	4.84	100
Visual Uncertainty	3	4.84	100
Material Weight	3	4.84	100
No Reaction	3	4.84	100
Interest/Intrigue	2	3.23	67
Materials	2	3.23	33
Emotion/Feeling	2	3.23	33
Drape	1	1.61	33
Uniqueness	1	1.61	33

The participants who viewed the dress with colored LED lights (viewing 3) answered the first interview question by stating that their first reaction to the dress was overwhelmingly in response to the lights as seen in Table 32. Participant statements about the lights included “I definitely noticed I was looking at the LED lights primarily,” “I wasn't expecting it to light up so that was kind of cool,” and “I noticed the lights immediately and I was surprised… my first reaction was that the lights were very bright.” Other comments about the lights included “I just saw the LEDs immediately, and it kind of felt very space-age, futuristic when I looked at it” and “the lights, I'm not sure what they do, but they seemed pretty neat to me.”

Table 32

Coding for Viewing 3 (Lights-only) Participant Responses to Interview Q1

Code	*f*	% Total Coding	% Coder Agreement
Lights	20	19.8	95
Print/Pattern	12	11.88	80
Color	11	10.89	73
Surprise/Excitement	10	9.9	83
Interest/Intrigue	9	8.91	60
Cut/Silhouette	7	6.93	78
Dress Area/Locations	6	5.94	100
Normal/Underwhelming	6	5.94	100
Association	5	4.95	83
Materials	4	3.96	67
Movement	4	3.96	67
Visually Appealing/Liked	3	2.97	33
Drape	2	1.98	33
Material Weight	1	0.99	33
Visual Uncertainty	1	0.99	33

For viewing 4 (music-lights), participants responded that their first reaction to the dress was regarding color as shown in Table 33. Participants commented on the color by saying “I think my attention went to the colors,” “it's very colorful, very bright,” and “the colors made me feel a little happy.” Some participants also commented on how it reminded them of watercolor pastels by stating “it was pastel,” and “it kind of reminded me of watercolor, kind of disco-ish.”

Table 33

Coding for Viewing 4 (Music-Lights) Participant Responses to Interview Q1

Code	*f*	% Total Coding	% Coder Agreement
Color	21	29.58	95
Emotion/Feeling	15	21.13	92
Association	9	12.68	83
Lights	7	9.86	67
Music	6	8.45	100
Dress Area/Location	3	4.23	100
Normal/Underwhelming	3	4.23	100
Cut/Silhouette	2	2.82	67
Surprise/Excitement	2	2.82	67
Interest/Intrigue	1	1.41	33
Visual Uncertainty	1	1.41	33
Wearability	1	1.41	33

The most common first reaction to the dress was towards color during a majority of viewings including viewing 1 (dress-only), viewing 2 (music-only), and viewing 4 (music-lights). The lights were the most common first reaction to the dress for viewing 3 (lights-only) as shown in Table 34.

Table 34

Participants' Most Common Reactions to the Dress for Viewings 1-4

Viewing	Most Common First Reaction
Dress-only (1)	Color
Music-only (2)	Color
Lights-only (3)	Lights
Music-Lights (4)	Color

- Interview Question 2 (coded under the dress aspects and beholder aspects theme) was "What was the most important part of the dress? Please explain."

According to participants during viewing 1 (dress-only), the belt (middle) was the most important part of the dress as indicated by Table 35. This area was most important due to its location on the dress as shown in Table 36. One of the participants mentioned why the belt was important by stating the following:

> I guess the belt in the center caught my eye pretty quickly 'cause it's very distinct in comparison to the rest of the dress. So, when I leaned in, I noticed like some wool or like yarn or something and then also like some sensors under there as well.

Other participants also mentioned that the belt (middle) area was the most important by sharing their thoughts that "I found the belt the most interesting, because it's the most different thing about it," "the middle was kind of interesting. It looks like it's recycled plastic maybe. (laughs) I'm an eco-friendly nerd so that jumped out at me," and "I would say the middle, the centerpiece, the plastic. It was the most eye-catching, I think."

Table 35

Viewing 1 (Dress-only) Participants' Answers to Interview Q2

Most Important Part of Dress	*f*	Percentage of Participant Responses
Belt/Middle	8	73
Fabric Colors	3	27
Fabric Pattern	1	9

Table 36

Coding for Viewing 1 (Dress-only) Participant Responses to Interview Q2

Code	*f*	% Total Coding	% Coder Agreement
Dress Area/Location	28	31.11	90
Materials	17	18.89	94
Color	14	15.56	93
Interest/Intrigue	11	12.22	33
Visually Appealing/Liked	5	5.56	50
Print/Pattern	4	4.44	33
Emotion/Feeling	3	3.33	100
Texture	3	3.33	100
Association	3	3.33	50
Uniqueness	1	1.11	33
Visual Uncertainty	1	1.11	33

Viewing 2 (music-only) participants responded to interview question 2 that the most important part of the dress was the fabric colors as indicated in Table 37 and Table 38. Participants who felt the fabric color was the most important stated that “the movement of the colors potentially. Ah, that's just drew my eye, just trying to figure out where are these colors intersecting and going,” “the colors and I feel like it was kind of translucent. I think it was pastelish colors. I remember pink and maybe green and blue,” and “I think color was the most important, because I think color sparks a mood and energy… it sparked a good mood.”

Table 37

Viewing 2 (Music-only) Participants' Answers to Interview Q2

Most Important Part of Dress	*f*	Percentage of Participant Responses
Fabric Colors	6	55
Belt/Middle	4	36
Material Weight	2	18
Sleeves	1	9

Table 38

Coding for Viewing 2 (Music-only) Participant Responses to Interview Q2

Code	*f*	% Total Coding	% Coder Agreement
Color	21	26.58	100
Dress Area/Location	15	18.99	83
Association	6	7.59	100
Material Weight	6	7.59	100
Texture	5	6.33	83
Materials	5	6.33	56
Interest/Intrigue	4	5.06	67
Movement	4	5.06	44
Drape	3	3.8	100
Emotion/Feeling	3	3.8	100
Visually Appealing/Liked	3	3.8	50
Visual Uncertainty	2	2.53	67
Surprise/Excitement	1	1.27	33
Uniqueness	1	1.27	33

For viewing 3 (lights-only), participants expressed that the most important part of the dress was the colored LED light belt as seen in Table 39 due mainly to the lights as shown in Table 40. Participants expressed this through such statements as "Ah, definitely the lights. Well, ah, I think for a couple of many reasons. For one, it's in the middle of the piece, and they are bright and flashing so they drew my attention." Similarly, another participant stated the following about the colored LED light belt:

> Definitely the LED belt. I just personally like lights, because I love technology, and I think lights are really cool. I like the fact that it's animated. It adds a time element to it rather than it being a static piece.

One participant mentioned how the belt "was glowing, it caught my attention at first." Meanwhile, another participant went into detail about the belt lights by exclaiming:

> I was most interested in the LED belt…I think because of the curiosity that I felt of how it would change, because I knew everything else was static. You know? And so I could kind of look at that and it was kind of interesting…The LED part, I was kind of captivated by the light color patterns and how it was changing and moving…I think that sense of, well this gets kind of into my own philosophy of art and artmaking, but I like when you don't necessarily control it, so whereas the technological part obviously was planned and designed and highly controlled, there seemed to be elements of the dyed fabric that were not controlled, and I like checking those places out, because they're kind of surprising and they're usually, actually it's kind of the same reason why I was watching the LED pattern, because you don't know what's going to happen and you want to see how it's going to turn out. So, the areas in the pattern in the dress that kind of break the form of the pattern, I guess are also what captivate me…The unknown is what kept my attention the most.

Table 39

Viewing 3 (Lights-only) Participants' Answers to Interview Q2

Most Important Part of Dress	*f*	Percentage of Participant Responses
LED Belt	6	55
Silhouette	3	27
Material	3	27
Fabric Color	2	18
Fabric Pattern	1	9
Material Weight	1	9
Sleeves	1	9
Bottom Hem	1	9

Table 40

Coding for Viewing 3 (Lights-only) Participant Responses to Interview Q2

Code	*f*	% Total Coding	% Coder Agreement
Lights	16	12.5	89
Dress Area/Location	14	10.94	93
Interest/Intrigue	14	10.94	78
Visually Appealing/Liked	14	10.94	58
Color	12	9.38	80
Materials	11	8.59	92
Cut/Silhouette	9	7.03	100
Print/Pattern	9	7.03	100
Movement	7	5.47	78
Personal Style	6	4.69	67
Association	5	3.91	56
Material Weight	4	3.13	50
Wearability	3	2.34	100
Surprise/Excitement	2	1.56	67
Emotion/Feeling	1	0.78	33
Visually Unappealing/Disliked	1	0.78	33

For viewing 4 (music-lights), the majority of participants said the most important part of the dress was the colored LED light belt found in Table 41. This aspect of the dress was the most important due to certain dress areas as shown in Table 42. Participants expressed that the colored LED belt area of the dress was most important by stating “the lights, kind of like, it's like the point where it drew my attention. At first, it was like the actual set of LEDs like you have for the belt,” “I love the LED waistband, because it was your main focus…It was just like, that was like twinkling,” “I also did like the lit-up belt. I thought that was cool. It was just different. It's something you just wonder if you could kind of tweak to make it different colors,” and “I think the color and the sound. Both the color of the lights and fabric. I think it's because the colors it just I was attracted to the colors I think that's why.”

Table 41

Viewing 4 (Music-Lights) Participants’ Answers to Interview Q2

Most Important Part of Dress	*f*	Percentage of Participant Responses
LED Belt	7	64
Fabric Colors	6	55
Sleeves	4	36
Sound	2	18
Material	2	18
Bottom	1	9
Left Side	1	9
Right Side	1	9

Table 42

Coding for Viewing 4 (Music-Lights) Participant Responses to Interview Q2

Code	*f*	% Total Coding	% Coder Agreement
Dress Area/Location	23	21.3	96
Color	20	18.52	90
Lights	17	15.74	94
Visually Appealing/Liked	12	11.11	67
Materials	6	5.56	100
Music	6	5.56	100
Emotion/Feeling	6	5.56	100
Movement	6	5.56	100
Interest/Intrigue	4	3.7	44
Cut/Silhouette	4	3.7	44
Association	3	2.78	67
Uniqueness	1	0.93	33

According to participants, the belt was the most important part of the dress except for during viewing 2 (music-only). Color was more influential during the viewings of the dress that incorporated music (viewings 2 and 4) compared to the viewings without music (viewings 1 and 3) as shown in Table 43.

Table 43

Participants' Answers to Interview Q2 for Viewings 1-4

Viewing	Most Important Part of Dress
Dress-only (1)	Belt
Music-only (2)	Color
Lights-only (3)	Belt
Music-Lights (4)	Belt and Color

- Interview Question 3 (coded under the dress aspects and beholder aspects theme) was "Was there a graceful flow to the dress? Please explain."

According to participants during viewing 2 (music-only), there was 100% agreement that the dress had a graceful flow (see Table 44). Participants during viewing 1 (dress-only) and viewing 4 (music-lights) were equally high in their 91% agreement that the dress had a graceful flow. Reasons why there was not fully in agreement to the dress having a graceful flow included a lack of literal movement caused by wind for a participant during viewing 1 (dress-only). Participants during viewing 4 (music-lights) shared that the dress was graceful except for the electronics, but the shape made it graceful. For participants viewing the dress with colored LED lights (viewing 3), participants felt this dress was perceived as having the least graceful flow due to loud multiple colors and lights, since there were too many aspects to focus on which interrupted the flow. These participants during the viewing of the dress with colored LED lights (viewing 3) also mentioned that they felt the graceful flow came specifically from the draping.

Table 44

Participants' Answers to Interview Q3 for Viewings 1-4

Viewing	% Agree Graceful Flow	% Somewhat Agree Graceful Flow	% Disagree Graceful Flow
Dress-only (1)	91	0	9
Music-only (2)	100	0	0
Lights-only (3)	64	9	27
Music-Lights (4)	91	9	0

Participants that viewed the dress-only during viewing 1 reported that there was a graceful flow mainly due to movement as shown in Table 45. An exemplar quote from a participant regarding the graceful flow of the dress only stated "absolutely, I mean just the way it

hung. Like it's stationary right there, but it seems like it'd have movement, the fabric was really light and airy."

Table 45

Coding for Viewing 1 (Dress-only) Participant Responses to Interview Q3

Code	*f*	% Total Coding	% Coder Agreement
Movement	16	24.24	67
Drape	14	21.21	78
Dress Area/Location	12	18.18	100
Material Weight	7	10.61	58
Materials	6	9.09	50
Association	4	6.06	67
Cut/Silhouette	3	4.55	50
Color	3	4.55	100
Visual Uncertainty	1	1.52	33

Participants that viewed the dress with digital music (viewing 2) expressed that there was a graceful flow to the dress mainly due to different areas of the dress as shown in Table 46. In particular, participants mentioned sleeves by stating "one of the arms which was kind of floating," "I liked all of the long flowy pieces of the sleeves and the neckline," and "it's just the way that it was draped. I think the sleeves themselves have a lot do with that…because of the sleeves themselves and the way that they were draped, that's what gave it that sort of grace."

Table 46

Coding for Viewing 2 (Music-only) Participant Responses to Interview Q3

Code	*f*	% Total Coding	% Coder Agreement
Dress Area/Location	15	23.81	100
Association	9	14.29	89
Movement	9	14.29	75
Music	6	9.52	100
Material Weight	4	6.35	100
Drape	4	6.35	67
Color	3	4.76	50
Emotion/Feeling	3	4.76	100
Materials	3	4.76	100
Print/Pattern	3	4.76	100
Visually Appealing/Liked	2	3.17	67
Cut/Silhouette	2	3.17	33

Participants that viewed the dress with colored LED lights (viewing 3) mainly mentioned the dress's color when answering if the dress had a graceful flow as shown in Table 47. Participants stated that "it was like this beautiful cut and then the pretty colors... the lighting in the middle, it took away from it, I think. It just seemed misplaced, it felt like it completely disrupted the flow," "the fabric itself was beautiful with colors adding an elegance to it," and "it's like the colors on it [had a graceful flow] it just kind of had like a tie dye, just like the colors and the way that they blended together." One participant went into more detail to describe the graceful flow of the dress by stating:

> I didn't really think about it. I would say so. I really, I don't know. Graceful, I wouldn't use, so I would say no. The colors were a bit loud for me. When I think grace, I think of one color or two, not too many colors. Graceful flow, though it blended, it wasn't sharp, but more so it was unorganized colors. So, like a lot of colors, graceful flow I didn't use, but there was a flow. Graceful, I think personally, I think wedding, something closer to a

wine tasting type of thing. That's what I think when I think graceful like Buckingham Palace. I don't know. It wasn't a bad dress. It just wouldn't be my definition of graceful.

Another participant also explained further about their perception of the dress of having a graceful flow with the following quote:

> The lights kind of threw me off, so no, but in a good way. So, where it was like grounded in the nature and the subtle colors of the fabric, then you have the overlay of like the obnoxious, not obnoxious in like a bad way but like obnoxious in a visual sense, of the lights, and I was having a really hard time focusing on trying to figure out the patterns. I like patterns, so I stared a really long time at the LED lights trying to figure out what they were doing. I really liked the color schemes and the color schemes worked well together. I think it's just the level of visual attention it takes to look at lights versus the fabric… You had to take your focus on, take your focus away from the lights to look at the fabric and like between the two. I like the fabric a lot.

Similar to these other participants, the following statement reaffirms that the lights did not add to the graceful flow of the dress in the following way:

> Yes, the type of the material made it seem flowy, not necessarily color. The color was calming, but not necessarily graceful in that way. I think the purple being dark made it look comforting. I guess I associate blue and green, like a river or beach would be graceful and stuff. For me, seeing that was like ok. It's nice but the lights for me were a little intense.

Table 47

Coding for Viewing 3 (Lights-only) Participant Responses to Interview Q3

Code	*f*	% Total Coding	% Coder Agreement
Color	17	13.71	94
Dress Area/Location	15	12.10	100
Movement	14	11.29	58
Cut/Silhouette	10	8.06	83
Drape	10	8.06	61
Lights	9	7.26	100
Materials	9	7.26	60
Visually Appealing/Liked	9	7.26	56
Association	8	6.45	53
Print/Pattern	7	5.65	78
Visually Unappealing/Disliked	4	3.23	67
Material Weight	3	2.42	67
Interest/Intrigue	3	2.42	50
Emotion	2	1.61	67
Texture	2	1.61	67
Visual Uncertainty	2	1.61	67

For viewing 4 participants (music-lights), the dress had a graceful flow, because of specific dress areas as described in Table 48. Participants commented on certain areas of the dress that gave it a graceful flow by stating “the arms seemed graceful. The music might've also been making me think it was graceful” and “I would say yes, except the belt wasn't graceful because it was electronic. I think the fabric. It wasn't like rugged or rough…So it was like sleek.” One participant expressed that the dress had a graceful flow by stating:

> Ya, after the belt it was shoulder to shoulder like from the sleeves. Ya, like left sleeve over to the upper shoulder to the right shoulder down. That was like the flow. Kind of thinking like the focal point from the belt kind of leads you down to the lower part of the dress, first off, so, I was, beside like the I think how the dress was laid out, like the actual

kind of like gradient effect going through it like the watercolor through it. It's also because of the belt had me start at the sleeve.

Another participant stated that the silk material sleeves moving gave the impression that the dress had a graceful flow from the following quote:

> Yes, well there was like wind on it, so it was kind of moving, but I could tell if you were walking, the like, again the sleeves are like big bell-sleeves, they would move and then the bottom of it. It looks like it was made out of like a silk-type material so I don't know, it would probably flow.

Table 48

Coding for Viewing 4 (Music-Lights) Participant Responses to Interview Q3

Code	*f*	% Total Coding	% Coder Agreement
Dress Area/Location	12	14.29	100
Movement	12	14.29	67
Materials	11	13.1	92
Color	10	11.9	83
Music	6	7.14	100
Cut/Silhouette	6	7.14	100
Association	6	7.14	100
Drape	3	3.57	100
Print/Pattern	3	3.57	50
Interest/Intrigue	3	3.57	100
Material Weight	3	3.57	100
Texture	3	3.57	100
Emotion/Feeling	2	2.38	67
Lights	2	2.38	67
Visually Appealing/Liked	2	2.38	33

- Interview Question 4 (coded under the dress aspects and beholder aspects theme) was "Where did your eyes focus longest on the dress as you looked? Why?"

Participants during viewing 1 (dress-only) said that they focused longest on the colored LED light belt as well as the fabric colors shown in Table 49. Participants mentioned that they focused longest due mainly to specific dress areas as shown in Table 50. For instance, participants mentioned "I would say probably to the right-hand side 'cause it had more blue, but also toward the middle-side because of the belt. I was trying to figure out what kind of material that belt was," "I feel like the left-side, like the purple side and the top center, I kind of like that sleeve. The purple side. I think I like, purple is my favorite color. I'm more drawn to that color naturally," and "probably the waistband just because that was the most interesting element to it. I think the combination of the fiber-work and the plastic around and the little tab stuff, I just thought it was really interesting."

Table 49

Viewing 1 (Dress-only) Participants' Answers to Interview Q4

Dress Area Focused on Longest	*f*	Percentage of Participant Responses
LED Belt	5	45
Fabric Color	5	45
Sleeves	2	18
Bottom	2	18
Left Side	1	9
Right Side	1	9
Top Center	1	9

Table 50

Coding for Viewing 1 (Dress-only) Participant Responses to Interview Q4

Code	*f*	% Total Coding	% Coder Agreement
Dress Area/Location	25	35.71	96
Interest/Intrigue	14	20	78
Color	12	17.14	100
Materials	7	10	78
Visual Uncertainty	3	4.29	50
Material Weight	2	2.86	33
Movement	2	2.86	67
Cut/Silhouette	2	2.86	33
Uniqueness	1	1.43	33
Visually Appealing/Liked	1	1.43	33
Association	1	1.43	33

Participants during viewing 2 (sound-only) stated that they focused longest on the colored LED light belt as shown in Table 51, which was mainly due to certain dress areas that drew the participants' attention shown in Table 52. Participants in particular mentioned, "I was enticed to looked," "my eyes just went there," "the purple kept grabbing me," and "I liked the purple colors and the green colors over there" when viewing the areas of the dress with music playing.

Table 51

Viewing 2 (Music-only) Participant Answers to Interview Q4

Dress Area Focused on Longest	*f*	Percentage of Participant Responses
LED Belt	6	55
Fabric Colors	4	36
Sleeves	3	27
Bottom	2	18
Left Side	1	9
Neckline	1	9
Top Torso	1	9
Shoulder	1	9

Table 52

Coding for Viewing 2 (Music-only) Participant Responses to Interview Q4

Code	*f*	% Total Coding	% Coder Agreement
Dress Area/Location	31	51.67	97
Color	11	18.33	92
Visually Appealing/Liked	4	6.67	67
Drape	3	5	100
Cut/Silhouette	3	5	100
Movement	3	5	50
Interest/Intrigue	1	1.67	33
Visual Uncertainty	1	1.67	33
Visually Unappealing/Disliked	1	1.67	33
Materials	1	1.67	33
Uniqueness	1	1.67	33

Participants that the viewed the dress during viewing 3 (lights-only) said that they focused longest on the colored LED light belt most amongst other areas of the dress as seen in Table 53. These areas were viewed longest mostly due to certain dress areas as well as the lights shown in Table 54. A participant mentioned the following regarding where they focused longest:

> Probably on the LED belt. Again, probably just, well the brightness of it for one you know and the brightness of the color and the light. And then just the seeing what would happen and being interested in that, but I do, I find as I've, I don't know if it's because I've gotten older, but you know like a bird, I'm absolutely drawn to like golds and bright metallic things, and bright colors. So, I've found myself focusing a lot on those bright colors in that LED belt.

Similarly, other participants mentioned "the belt because it lit up and had an animation to it," "probably the LEDs…They were brighter, and they were moving, and changing so every time like the colors would change or shift it felt like I was looking at those more," "probably on the belt area, the lights because they were blinking," and "the top part, so like the belt and above.

I guess the lights may be directed. I didn't go below the lights much. I focused mainly on the top…the lights almost directed you to go that way." Another participant also mentioned how the lights directed their focus by stating the following:

> Definitely the lights. Trying to just look for the pattern, and they're more demanding. The lights were more demanding in attention. So, the lights moved, so I was trying to figure out where the colors were going, 'cause there was one time when there's like a few red lines that go, so I was trying to figure out how they were moving.

Table 53

Viewing 3 (Lights-only) Participant Answers to Interview Q4

Dress Area Focused on Longest	*f*	Percentage of Participant Responses
LED Belt	7	64
Top/Torso	3	27
Neckline	1	9
Sleeves	1	9
Bottom	1	9
Shoulder	1	9

Table 54

Coding for Viewing 3 (Lights-only) Participant Responses to Interview Q4

Code	*f*	% Total Coding	% Coder Agreement
Dress Area/Location	26	28.89	96
Lights	18	20	100
Movement	9	10	50
Cut/Silhouette	8	8.89	67
Interest/Intrigue	8	8.89	67
Color	6	6.67	67
Materials	3	3.33	100
Personal Style	3	3.33	100
Visually Appealing/Liked	3	3.33	50
Uniqueness	2	2.22	67
Association	1	1.11	33
Print/Pattern	1	1.11	33
Visual Uncertainty	1	1.11	33
Normal/Underwhelming	1	1.11	33

Participants that viewed the dress during viewing 4 (music-lights) said they focused longest on the colored LED light belt as described in Table 55. These areas were focused on primarily because of certain dress areas, lights, and color as listed in Table 56. For instance, participants stated “I would say probably the center, because of the lighting. I guess because the lights were changing and the different colors were appealing and relaxing,” “definitely the belt with the lights. Probably just the animation… the lights were red…lights were green so I was trying to study it,” and “probably on the belt. It's just the blinking lights, I don't know. They kept changing so it kept my attention longer.”

Table 55

Viewing 4 (Music-Lights) Participant Answers to Interview Q4

Dress Area Focused on Longest	*f*	Percentage of Participant Responses
LED belt	7	64
Color	3	27
Right side	2	18
Neckline	2	18
Sleeves	1	9
Top/Torso	1	9
Silhouette	1	9

Table 56

Coding for Viewing 4 (Music-Lights) Participant Responses to Interview Q4

Code	*f*	% Total Coding	% Coder Agreement
Dress Area/Location	18	18.75	86
Lights	16	16.67	100
Color	14	14.58	78
Interest/Intrigue	7	7.29	67
Visually Appealing/Liked	7	7.29	58
Movement	6	6.25	50
Materials	5	5.21	83
Personal Style	5	5.21	83
Print/Pattern	4	4.17	67
Cut/Silhouette	4	4.17	67
Emotion/Feeling	4	4.17	67
Surprise/Excitement	2	2.08	67
Association	1	1.04	33
Uniqueness	1	1.04	33
Visual Uncertainty	1	1.04	33
Visually Unappealing/Disliked	1	1.04	33

During all viewings, the colored LED light belt was the area that participants reported focusing on the longest as confirmed by heat maps, and fabric color was the second most important area in all viewings except for viewing 3 (lights-only) where participants stated they focused on the top torso area as seen in Table 57. The color of the fabric was not important at all during viewing 3 (lights-only). In comparing all viewings, viewing 4 (music-lights) was the only viewing where participants did not focus on the bottom of the dress. Neckline was not reported only during viewing 1 (dress-only). The right side of the dress was mentioned during the first and last viewings (dress-only and music-lights). The left side of the dress was mentioned during the first two viewings (dress-only and music-only) rather than during the viewings with lights (lights-only and music-lights). Shoulders were mentioned during the second and third viewings (music-only and lights-only).

Table 57

Participants' Answers to Interview Q4 for Viewings 1-4

Viewing	Dress Area Focused on Longest	Second Area Focused on Longest
Dress-only (1)	LED belt	Color
Music-only (2)	LED belt	Color
Lights-only (3)	LED belt	Top/Torso
Music-Lights (4)	LED belt	Color

- Interview Question 5 (coded under the story aspects theme) was "What do you think is the story behind the dress?"

Participants that responded to this question during viewing 1 (dress-only) referenced aspects of eco-friendly/nature primarily as seen in Table 58. Eco-friendly/nature coding came from references to the dress being created by "somebody who's crafty and makes their own eco-

friendly dresses," while another participant referenced "the kind of greenish-blue color, I would say, and the plastic, you know, kind of evoked an ocean-type of thing. You know plastic in the ocean is a big issue right now." Concerning fashion coding, participants mentioned thinking that "the person who maybe created the dress maybe somebody who would be interested not only in fashion, but also in someone being comfortable. I think comfortable, nice attire, that's fashionable and can be worn in multiple…. It's not extremely formal, but you could wear it just about anywhere" and that "it's something that like could be an upcoming trend like a fashion trend."

The coding for freedom came from participants expressing sentiments such as "it reminds me of like a butterfly, like free and flowy." Time coding was due to references such as "it's kind of got this Hippies 50s, 60s thing, just because its flowy and it's got this tie-dye thing going on" as well as references to World War II zoot suits in Los Angeles. Participants who expressed statements such as "I have no clue," "Gosh, I don't know," and "I just don't know what it is" were assigned coding that referenced that nothing came to mind for the story behind the dress.

Table 58

Coding for Viewing 1 (Dress-only) Participant Responses to Interview Q5

Code	*f*	% Total Coding	% Coder Agreement
Nature/Eco-Friendly	10	19.61	83
Fashion	8	15.69	67
Freedom	7	13.73	78
Nothing	6	11.76	100
Time	6	11.76	67
Repurposed	4	7.84	67
Diverse/Diversity	4	7.84	67
Artistic	3	5.88	50
Feminine	2	3.92	67
Emotion/Feeling	1	1.96	33

Participants mentioned in viewing 2 (music-only) that the story of the dress centered mainly around artistry shown in Table 59. Participants mainly focused on the artistic aspect of the dress which was captured by statements such as the story behind the dress was "to be a thing of beauty, an object of beauty" and that "the way the colors were on it and stuff, which I thought was really neat. It's almost as if you're an artist and you get paint all over yourself, but it was done in an elegant way, to say like, hey these are my art clothes, but it's high fashion." Another participant said "if I saw a woman walking into a restaurant or something with that dress on I just feel like it would exude, like she would be very graceful, and well poised, and confident. I could go on." Therefore, the graceful nature of the dress made it artistic.

There were also participants who expressed a freedom and emotional response to the dress such as "I see a lot of freedom, liberation, just very free-spirit, or free-spirited. I see joy and security, positivity, good vibes, good energy." There were also participants who said that "nothing comes to mind," "I don't think there is a story behind the dress," and "I mean I don't think there was any real meaning behind it. I think it was just a dress with colors."

Table 59

Coding for Viewing 2 (Music-only) Participant Responses to Interview Q5

Code	*f*	% Total Coding	% Coder Agreement
Artistic	8	17.78	53
Nothing	7	15.56	58
Freedom	6	13.33	100
Emotion/Feeling	6	13.33	40
Time	6	13.33	100
Fashion	5	11.11	83
Diverse/Diversity	3	6.67	50
Nature/Eco-friendly	2	4.44	67
Costume	1	2.22	33
Feminine	1	2.22	33

Participants during viewing 3 (lights-only) stated that the story behind the dress was primarily that the dress was a costume as listed in Table 60. The majority of participants expressed that the story behind the dress was that the dress was a costume due to comments such as “it looks like it's futuristic…like it made me think it would be something I would see in a movie that was taking place in the future, well into like 2040s or something like that,” “it might be something related to the moon ride, which is like an outdoor or night-time bike ride. People get all dressed up with light,” and “I felt like it was for a party, like for a costume-type of party, some sort of special event that called for a specific dress code so I thought costume-type of party.” Other participants mentioned that “it seems like something that someone would wear to like an art opening or a music concert, something like that” or that it has “a Scifi feeling,” which also enforces that the dress’s story relates to being a costume.

Participants also mentioned that the dress evoked a sense of diversity by stating that “it reminds me of someone from a small-town with a nature focus that moves to a bigger city incorporating more groundedness with the high-paced newer technology” and that it is a “fusing of technology with fabric,” which is trying to reconcile diverse materials. One participant in particular had an exemplar quote for this sense of diversity by stating:

> It’s about trying to reconcile, still hoping to create handmade goods and to celebrate the things that are gentle and soft in a world where what's hard, like hard sciences and literally hard, and technological has kind of taken over, and to me like it was interesting to look at, but I didn't feel like it did necessarily mesh together in a way, but you know, like they felt very dichotomous and like it wasn't exactly a harmonious whole for me, so I think the story is trying to reconcile these two ways of life that are becoming very

important. I mean the handmade movement is huge and obviously technology is not going anywhere, but that maybe we still haven't gotten there.

Other participants mentioned artistic and emotional qualities behind the story of the dress such as “for me I think that it seems like a watercolor painter used a brush to throw colors into a piece of material to become part of the dress” and “it's a dress that is trying to be a bit whimsical.”

Table 60

Coding for Viewing 3 (Lights-only) Participant Responses to Interview Q5

Code	*f*	% Total Coding	% Coder Agreement
Costume	13	28.89	72
Diverse/Diversity	6	13.33	67
Artistic	5	11.11	42
Emotion/Feeling	5	11.11	42
Time	4	8.89	67
Fashion	3	6.67	50
Repurposed	3	6.67	100
Feminine	3	6.67	100
Nature/Eco-friendly	2	4.44	67
Nothing	1	2.22	33

Participants during viewing 4 (music-lights) described the dress’s back story to be related primarily to femininity as well as costume as found in Table 61. There were several examples where participants stated the story behind the dress was connected to it being a costume. For instance, participants made statements such as “a lady was wearing a dress one time in a boundless beautiful belt with all these lights in it, and it made her a musical fairy of some kind,” “I can imagine a princess from a planet out of the earth,” and “I keep wanting to go back to like the gothic kinda castle idea of it like that's where I would imagine I would see it. It's kind of in a

movie like that." One participant mentioned that it reminded them of the Claire Danes LED light Cinderella dress, while another participant referenced "60's 70's festival-wear" where someone with "an interest in Lord of the Rings designed it with kind of a modern-techno-vibe to it."

There was also a feminine aspect that participants mentioned related to the story behind the dress. Some of the comments from participants regarding femininity included "I just went through the exhibit, and it was based on US problems so it may be like a feminism type of like supporting strong women type of thing. That may be a response based on my experience in the museum," and another participant said "I think maybe a female that wants to feel comfortable in her own skin" was the meaning behind the dress.

Emotion was another important topic discussed when participants described what they thought the story was behind the dress. Some very descriptive examples of this include one participant mentioning "it seemed very tragic…. the music was tragic and the color changes seemed tragic. It was graceful though, but I feel there was a sadness to it. I don't know if that is more a story as a feeling." Another participant felt the music and lights made the dress seem "more like an experience. I guess the creation for it was an experience. That's all I can think of with the music and everything. It's really calming. I just have no narrative for it."

Table 61

Coding for Viewing 4 (Music-Lights) Participant Responses to Interview Q5

Code	*f*	% Total Coding	% Coder Agreement
Feminine	11	26.83	67
Costume	10	24.39	67
Emotion/Feeling	5	12.2	83
Subjective	4	9.76	33
Nothing	3	7.32	33
Nature/Eco-friendly	2	4.88	67
Diverse/Diversity	2	4.88	33
Time	2	4.88	67
Fashion	1	2.44	33
Freedom	1	2.44	33

Across all viewings, the two viewings with lights (viewings 3 and 4) both shared strong associations to costume when participants shared their thoughts about the story behind the dress (see Table 62). Participants during viewing 1 (dress-only) felt the story behind the dress most closely referenced an eco-friendly/nature association, whereas participants during viewing 2 (music-only) felt the story behind the dress was mainly artistic. Femininity and fashion were strongly associated with the story behind the dress with synchronized digital music and colored LED lights (viewing 4). Furthermore, it is noteworthy that participants verbalized a distinct difference between the different viewings as to their being more associated with fashion, art, or costume. For instance, the dress-only viewing (1) was more closely associated with fashion than the other dresses, the musical dress (viewing 2) was perceived as more artistic, and the last two viewings with lights (viewings 3 and 4) were described as more associated with costume.

Table 62

Participants' Answers to Interview Q5 for Viewings 1-4

Viewing	Story Behind the Dress
Dress-only (1)	Eco-friendly/Nature
Music-only (2)	Artistic
Lights-only (3)	Costume
Music-lights (4)	Feminine and Costume

- Interview Question 6 (coded under the story aspects theme) was "What did the dress remind you of?"

According to participants during viewing 1 (dress-only), the dress reminded them of eco-friendly/nature shown in Table 63. Participants referenced nature when addressing what the dress reminded them of by saying it reminded them of a beta fish with draping tails and fins, clouds, a butterfly, water, and the sky at sunrise and sunset. Participants also expressed that the dress reminded them of certain fashions such as a kimono, resort-wear, and clothing like H&M or Forever 21. Certain eras were also mentioned by participants such as the 70s and 80s.

Table 63

Coding for Viewing 1 (Dress-only) Participant Responses to Interview Q6

Code	*f*	% Total Coding	% Coder Agreement
Nature/Eco-friendly	14	36.84	78
Fashion	8	21.05	44
Time	6	15.79	100
Artistic	4	10.53	67
Freedom	3	7.89	100
Costume	2	5.26	67
Subjective	1	2.63	33

Participants that viewed the dress with digital music (viewing 2) expressed that the dress reminded them of a certain time as shown in Table 64. Time was an important aspect in this viewing as participants referenced being reminded of the 70s and 80s similar to participants during viewing 1, summertime, spring, and the early 90s. Concerning nature, participants referenced flowers, grass, trees, earthy, isle, landscape, skylines, and a sunset at the beach. For costume, participants were reminded of childhood characters, Disney Princess' dress, and TV shows.

Table 64

Coding for Viewing 2 (Music-only) Participant Responses to Interview Q6

Code	*f*	% Total Coding	% Coder Agreement
Time	14	29.79	67
Nature/Eco-friendly	10	21.28	83
Costume	9	19.15	75
Nothing	4	8.51	67
Freedom	3	6.38	100
Emotion/Feeling	3	6.38	50
Artistic	2	4.26	67
Feminine	1	2.13	33
Fashion	1	2.13	33

Participants during viewing 3 (lights-only) said the dress reminded them primarily of a costume as listed in Table 65. Participants referred to the dress as a costume for a dance party, Scifi movie, and events (i.e., Easter and outer-space event). Time was also referenced by discussing the future (i.e., futuristic) and spring. Participants spoke of artistic aspects to the dress including watercolor, crafts, and tie-dye.

Table 65

Coding for Viewing 3 (Lights-only) Participant Responses to Interview Q6

Code	*f*	% Total Coding	% Coder Agreement
Costume	8	21.05	67
Time	7	18.42	67
Artistic	6	15.79	67
Nature/Eco-friendly	5	13.16	83
Emotion/Feeling	5	13.16	56
Feminine	4	10.53	67
Nothing	2	5.26	33
Fashion	1	2.63	33

Participants during viewing 4 (music-lights) expressed that the dress reminded them of a costume as shown in Table 66. Participants mentioned that the dress reminded them specifically of a pageant, wedding, Clare Dane's LED dress, Arwen from Lord of the Rings, a disco party, concerts, and a children's TV show where a boy with a purple crayon would draw items that became three-dimensional.

Table 66

Coding for Viewing 4 (Music-Lights) Participant Responses to Interview Q6

Code	*f*	% Total Coding	% Coder Agreement
Costume	11	23.91	73
Emotion/Feeling	9	19.57	75
Nature/Eco-friendly	9	19.57	75
Time	5	10.87	83
Nothing	5	10.87	56
Diverse/Diversity	2	4.35	67
Fashion	2	4.35	67
Feminine	2	4.35	67
Artistic	1	2.17	33

Participants varied in what the dress reminded them of the most except for during the viewings with lights (viewings 3 and 4). Both viewings 3 and 4 reminded participants of costumes. Viewing 1 (dress-only) reminded participants of nature and viewing 2 (music-only) reminded participants of time (see Table 67).

Table 67

Participants' Answers to Interview Q6 for Viewings 1-4

Viewing	Dress Reminds Participants of the Most
Dress-only (1)	Nature
Music-only (2)	Time
Lights-only (3)	Costume
Music-lights (4)	Costume

- Interview Question 7 (coded under the story aspects theme) was "What does the dress tell you about art itself?"

During viewing 1 (dress-only), participants said the dress told them about art mostly through diversity as shown in Table 68. "Art can take different forms," art is "multi-layered," and art is "broad" are all ways that participants expressed that the dress informs about art. Art is also subjective to this group of participants, because art is "open to a lot of interpretation" while there are different opinions about what "speaks" to different individuals. Other statements such as "well, it's colorful and expressant, and you can get it many different ways. Instead of just being on just a canvas, you can wear it. Show it off and it can be a part of your daily life" are considered related to fashion as wearable art.

Other supportive statements to fashion being an important category included "I wasn't expecting a dress, and then seeing that, I think art comes in so many different forms, and it's not just one craft or type of thing," "clothing, it can be the kind of art that you see on a canvas, but

it’s on a different medium,” “I don’t usually think of a dress as art, but that one was very artistic,” “we don't always think of art as being fashion… when you initially think art, you initially think of a painting on the wall or not something you wear every day. So, it's interesting, I think, to think of it from that point of view,” and “art can be very practical.” Theses statements all suggest that fashion should be considered an art form.

Table 68

Coding for Viewing 1 (Dress-only) Participant Responses to Interview Q7

Code	*f*	% Total Coding	% Coder Agreement
Diverse/Diversity	15	26.32	63
Subjective	12	21.05	67
Artistic	12	21.05	57
Fashion	6	10.53	33
Freedom	5	8.77	83
Feminine	3	5.26	67
Emotion/Feeling	3	5.26	50
Nature/Eco-friendly	1	1.75	33

Participants who viewed the dress with digital music (viewing 2) had an exemplar quote for fashion as a coding category by stating that “fashion is art. It's wearable art, and I think that's just the canvas … I think fashion is wearable art.” Along with this quote, participants felt that diversity and subjectivity were two important aspects that the dress conveyed about art (see Table 69) similar to participants during viewing 1 (dress-only). According to these participants, art is diverse since fashion garments are one of the many forms of artistic expression, “art can be anything,” “art is three-dimensional,” and “the different colors… make you look longer.” Participants also felt this dress showed how subjective art can be by saying that “anything is open for discussion” and “look for what you like in the piece.”

Table 69

Coding for Viewing 2 (Music-only) Participant Responses to Interview Q7

Code	*f*	% Total Coding	% Coder Agreement
Diverse/Diversity	16	42.11	59
Subjective	9	23.68	100
Artistic	7	18.42	58
Fashion	4	10.53	44
Nothing	2	5.26	33

Participants who viewed the dress with colored LED lights (viewing 3) shared aspects of diversity and subjectivity that informed them about what the dress told them about art itself among other codes listed in Table 70. Diversity was an important aspect that emerged through participants saying “that it's ok to combine foreign mediums in a sense. There's no boundaries to what you can do. Most people would not put technology in fabric like that so it's interesting to see that marriage of those two,” “what art can discuss and what art can be made of is so broad and how many forms art can take,” and “The LED belt made me think that you can merge together any medium.”

Subjectivity was also acknowledged as playing a role in what participants believed about art itself after viewing the dress. The topic of subjectivity came about by participants saying “that it's very subjective. It can be interpreted many ways,” “it's still art because so many different people can appreciate it,” and “I feel like someone will always like, like I don't think there is a piece of art that nobody will like. I think someone will have an eye for it, and it'll be perfect for them.”

Table 70

Coding for Viewing 3 (Lights-only) Participant Responses to Interview Q7

Code	*f*	% Total Coding	% Coder Agreement
Diverse/Diversity	16	34.78	53
Subjective	15	32.61	71
Artistic	6	13.04	50
Fashion	6	13.04	67
Nothing	1	2.17	33
Freedom	1	2.17	33
Repurpose	1	2.17	33

Participants that viewed the dress with synchronized digital music and colored LED lights (viewing 4) expressed that what the dress said about art itself was overwhelmingly connected to diversity (see Table 71). Diversity emerged due to participants expressing that "you can combine different things, and it'll create something really cool. Things that people wouldn't expect to go together" and "I really think it's cool that art …just like with the lights with fabric…they're just crossing different boundaries and intermingling which is very cool."

Table 71

Coding for Viewing 4 (Music-Lights) Participant Responses to Interview Q7

Code	*f*	% Total Coding	% Coder Agreement
Diverse/Diversity	19	52.78	95
Subjective	4	11.11	67
Nothing	4	11.11	67
Emotion/Feeling	3	8.33	100
Freedom	3	8.33	100
Artistic	2	5.56	33
Fashion	1	2.78	33

Participants during all viewings agreed that diversity (i.e., bringing different materials together can take many forms) is what the dress said about art itself. Also, participants during viewings 1 (dress-only), 2 (music-only), and 3 (lights-only) also frequently expressed that the dress represented that art is subjective (e.g., it is open to interpretation). These answers by participants to viewings 1-4 for question 7 can be found in Table 72.

Table 72

Participants' Answers to Interview Q7 for Viewings 1-4

Viewing	Dress States About Art Itself
Dress-only (1)	Diversity and Subjectivity
Music-only (2)	Diversity and Subjectivity
Lights-only (3)	Diversity and Subjectivity
Music-lights (4)	Diversity

- Interview Question 8 (coded under the dress aspects and beholder aspects theme) was "Did you find the dress interesting? Why?"

The dress with synchronized digital music and colored LED lights (viewing 4) was thought to be the most interesting compared to the rest of the viewings. Viewing 2 (music-only) was the least interesting viewing as shown in Table 73. A participant in viewing 1 (dress-only) found the dress somewhat interesting by stating "it was ok, mainly just the colors, I like how the colors were used." Participants who did not think the dress was interesting stated: they are not usually interested in dresses (viewing 1, dress-only), they expected something else (viewing 2, music-only), it was something that "could be found at a department store" (viewing 2, music-only), and culturally it was not unique since "I see that like every day so it's too normal for me back in China. My mom wears this kind of dress. She has a lot of these kind of dress. Back in China, especially females wear a lot of these dress out on the street" (viewing 3, lights-only).

Table 73

Participants' Answers to Interview Q8 for Viewings 1-4

Viewing	% Interesting	% Somewhat Interesting	% Disagree Interesting
Dress-only (1)	82	9	9
Music-only (2)	82	0	18
Lights-only (3)	91	0	9
Music-lights (4)	100	0	0

Participants during viewing 1 (dress-only) expressed that they thought the dress was mainly interesting because of the dress's color as shown in Table 74. Color was a commonly expressed reason for participants to find the dress interesting along with intrigue and pattern in this viewing by stating "I like to look at the way that the colors move into the other colors, the way that they overlay on top."

Table 74

Coding for Viewing 1 (Dress-only) Participant Responses to Interview Q8

Code	*f*	% Total Coding	% Coder Agreement
Color	16	23.53	89
Interest/Intrigue	10	14.71	56
Print/Pattern	9	13.24	100
Uniqueness	7	10.29	78
Visually Appealing/Liked	7	10.29	47
Visually Unappealing/Disliked	5	7.35	83
Movement	4	5.88	67
Material Weight	3	4.41	100
Materials	3	4.41	100
Normal/Underwhelming	2	2.94	67
Dress Area/Location	1	1.47	33
Drape	1	1.47	33

Participants during viewing 2 (music-only) thought the dress was interesting due mainly to the color as shown in Table 75. An exemplar quote for participants during this viewing answered the question of whether they thought the dress was interesting by stating “yes, I did. I think it just wasn't your typical solid color with a couple beads. It definitely was eye-catching with the different colors on it.”

Table 75

Coding for Viewing 2 (Music-only) Participant Responses to Interview Q8

Code	*f*	% Total Coding	% Coder Agreement
Color	13	16.05	87
Dress Area/Location	11	13.58	92
Uniqueness	11	13.58	73
Interest/Intrigue	7	8.64	58
Association	7	8.64	58
Movement	6	7.41	100
Visually Appealing/Liked	5	6.17	56
Music	3	3.7	100
Visual Uncertainty	3	3.7	100
Cut/Silhouette	3	3.7	50
Normal/Underwhelming	3	3.7	33
Materials	2	2.47	67
Visually Unappealing/Disliked	2	2.47	67
Drape	1	1.23	33
Surprise/Excitement	1	1.23	33
Lights	1	1.23	33
Personal Style	1	1.23	33
Wearability	1	1.23	33

Participants that saw the dress with colored LED lights (viewing 3) stated that the dress was interesting due mostly to lights shown in Table 76. Participants expressed their intrigue with this dress by stating “it just made me wonder,” “the lights, it's just really what kept my focus on it,” and “the lights were moving and kind of drew you in more.” One participant stated their

intrigue with the garment by stating the following:

> I love things that are paradoxical and have dichotomies and so I think just kind of it made me think about that, and you know probably it was interesting, because I didn't feel like the two parts necessarily went together, ya, so you sometimes, I don't know if you spend more, I mean, I've read lots of studies about this, and I don't remember, but if you spend more time, it's like if it's, it's kind of like that stress curve or whatever, like if it's too beautiful and calming, you maybe don't spend that much time, and if it's too like crazy out of control, you don't spend as much time, but it was sort of in the middle where they were like very close for me to going together, but just not quite so it made me more captivated by it.

Participants also remarked that the lighting interested them by saying that the lights "bring in a new facet" and "you don't know what the lights do. You don't know if they do anything. It's open to possibilities." Certain areas of the dress and color also generated interest according to participants, such as "I like the color a lot. I'm very drawn to color, and I like the way it was on the different sleeves. It was different, and also, I like the way that the lights changed color. I felt like it has a nice balance of color," "it was unique, the belt around it, and the colors, so in that sense, there was a connection between the colors and the belt," and "I just like the colors of it mostly and the cut and the belt was interesting, but not my favorite part."

Table 76

Coding for Viewing 3 (Lights-only) Participant Responses to Interview Q8

Code	*f*	% Total Coding	% Coder Agreement
Lights	20	21.98	95
Interest/Intrigue	16	17.58	76
Dress Area/Location	15	16.48	83
Color	12	13.19	100
Visually Appealing/Liked	7	7.69	78
Movement	6	6.59	50
Uniqueness	4	4.4	67
Association	4	4.4	67
Cut/Silhouette	3	3.3	100
Normal/Underwhelming	2	2.2	67
Visually Unappealing/Disliked	1	1.1	33
Wearability	1	1.1	33

Participants that viewed the dress with synchronized digital music and colored LED lights (viewing 4) stated that the dress was interesting primarily because of the lights (see Table 77). In particular, participants expressed that “aesthetically, it was just really well cut I think, and the colors were intriguing. The lights were interesting if not extra.” Uniqueness was also mentioned by participants by stating “it's definitely unique. It's not really symmetrical, which I appreciated,” “it's not what you kind of imagine when you think of a dress I guess. It was a lot to look at, a lot to keep your attention,” “it was kind of an unusual combination…more Electric Dance Music type of wear,” and “it's something new and different that you don't see a lot yet, but hopefully it will be.” One participant mentioned that the music made it unique by saying:

> Well it doesn't look like a normal dress and… the belt with the lights, without it [the belt] it looks pretty normal, but with it, it was distinguished from other dresses, and the sound made a huge difference, I think. It made me more focused on the dress and it made the dress more mysterious.

Another participant reinforced the importance of the music by their following comment: Each piece uniquely is interesting, and it's the like collaboration of all of them just makes it that much more interesting. Like the fabric, like I like water coloring a lot so the actual way the fabric was laid out, the painterly style fabric, I liked it a lot, but I didn't notice that first. It was the belt, and the belt is like just a set of LEDs that, I think it just, I'm not sure if it flashes randomly or to the music, but it seemed like it was to the music and that takes it to another element.

Table 77

Coding for Viewing 4 (Music-Lights) Participant Responses to Interview Q8

Code	*f*	% Total Coding	% Coder Agreement
Lights	15	15	100
Interest/Intrigue	13	13	87
Uniqueness	13	13	72
Color	9	9	78
Association	8	8	88
Cut/Silhouette	7	7	78
Dress Area/Location	7	7	78
Music	7	7	88
Materials	6	6	100
Visually Appealing/Liked	5	5	42
Material Weight	2	2	67
Movement	2	2	33
Normal/Underwhelming	2	2	33
Print/Pattern	2	2	67
Drape	1	1	33
Wearability	1	1	33

Participants during viewing 1 (dress-only) and viewing 2 (music-only) mentioned that color was the primary reason for interest in the dress as compared to the viewings that incorporated colored LED lights (viewings 3 and 4). Thus, that the lights took precedence over

color when participants were exposed to the colored LED lights, and participants expressed that the lights were the reason for finding the dress interesting (see Table 78).

Table 78

Coding for Viewings 1-4 Participants' Answers to Interview Q8

Viewing	Primary Reason for Participant Interest in the Dress
Dress-only (1)	Color
Music-only (2)	Color
Lights-only (3)	Lights
Music-lights (4)	Lights

- Interview Question 9 (coded under the emotion aspects theme) was "How did this dress make you feel? Please explain."

Participants that viewed the dress-only (viewing 1) verbalized that they mostly felt calm as listed in Table 79. Participants described springtime as "whatever sping-time feels like (laughs). Ah, kind of free and colorful and it's not super heavy and hot, more airy" and "free, flowy, springtime." Calm was described as "comforting almost. Not off-putting. It's very comforting. Relaxing. The way that if flows and the colors. The colors are not very bright, they are very soft pastel colors. It kind of reminds you of a nice summer day," "calm, the colors feel calm, and I think like the flow of the fabric is not really in your face," "calm, like the green in it I think was the calming or just like peaceful looking," and "it was kind of calming. I guess the colors again, blue and green."

Another participant stated how the dress made them feel calm:

> Um, honestly, kind of maybe at ease. It just kind of, even though it's not what I would wear, it does look very comfortable. It does look like something that would be pleasant on the skin. I mean you can kind of tell I'm wearing something very loose and flowy right

now, and the colors are very soft and pleasant. Nothing shocking to the eyeballs.

Other participants mentioned that they felt intrigued by the dress by stating they were "intrigued, just I find things that have been designed in a specific way intriguing to figure out what the intent was behind it," or "I thought it was interesting, I thought it was colorful."

In particular, one participant mentioned the dress made them intrigued by stating:

> Good, I guess. I don't think it had an extreme like emotional connection, but I thought it was, I enjoyed looking at it. I thought it was really pretty. I think it felt good, because it was interesting looking at something and trying to think about that. So, that feeling of what's going on, being a little bit confused, but intrigued. It just feels good. Like, it feels good to put in that effort. Like, I just don't want to see something generic. I want to be pushed a little bit.

Table 79

Coding for Viewing 1 (Dress-only) Participant Responses to Interview Q9

Code	*f*	% Total Coding	% Coder Agreement
Calm	15	39.47	100
Intrigued	9	23.68	100
Springtime	7	18.42	77
Surprised	3	7.89	100
Happy	2	5.26	67
Weird	2	5.26	67

Participants that viewed the dress during viewing 2 (music-only) said they felt mostly happy and neutral as mentioned in Table 80. Participants that reported feeling happy mentioned that they felt "good, happy, not very serious or very heavy, you know, I felt very light… I think because of the material, I think because of the color palette, I think it just gave me a very light

and airy feel," "happy, it just looked like it would be something that's comfortable and bright," and "it made me feel happy, because of all of the different colors. I like the happy colors."

The following excerpt from a participant mentioned how their mood changed from viewing the dress with digital music:

> Light and airy, nice and cool, just like it's a nice cool day, just like it is now like it changed my mood a little bit. I wasn't in a bad mood or anything, but it just kind of, I don't know, lifted me up when the music was playing, and it just felt good.

Some participants reported no change in their feeling by stating "I don't know. I don't think it made me feel a particular way. Not really any emotion attached to it," "I can't say one thing in particular. I don't know. It didn't change my mood- not that I noticed," and "Pretty neutral. I know it was the main thing that I had to focus on, but it just didn't impress me. The colors weren't bright enough for me I guess."

One participant in particular mentioned that they felt the following towards the dress with digital music:

> Neutral. I was staring at it trying to get as much as possible. I was more focusing on the details rather than my own feelings, so I couldn't say that I have any feelings. I like it, I enjoy it, but I'm not such an artsy person.

Other participants expressed that the music made them feel calm stating "I think at peace, because it had a whimsical look to it… it really brings you in. I think because it's soft colors and the various colors aren't grabbing you in a gody way, so it's nice to look at" and "Peaceful, going along with the whole free-flowing idea of the dress." More specifically, one participant said it was the music not the dress that made it peaceful by stating "it was mainly the sounds that made it relaxing, but the dress in itself didn't make it [relaxing]. I was just really confused really."

Table 80

Coding for Viewing 2 (Music-only) Participant Responses to Interview Q9

Code	*f*	% Total Coding	% Coder Agreement
Happy	14	33.33	78
Neutral	14	33.33	93
Calm	9	21.43	100
Surprised	2	4.76	67
Weird	2	4.76	67
Springtime	1	2.38	33

Participants during viewing 3 (lights-only) mentioned that they experienced feeling primarily intrigued as shown in Table 81. Primarily participants who viewed the dress with colored LED lights stated they felt intrigued by saying they were “intrigued, kind of curious,” “it was like more like thought-provoking I guess than visually super satisfying,” and “I mean I was curious I guess. I want to learn more about who made the dress, where did it come from.”

Other comments about the dress indicated that participants felt happy, because it was fun and made them ready to party. For instance, one participant stated that the dress was “Fun, it was again being not formal. It didn't make me feel like I had to be formal, so I felt relaxed and pretty much ready to party.” A similar quote from another participant stated:

> It was kind of fun. It had a warm feeling. Almost like a fun costume or something. The dress itself felt like something I would like to wear, but then having like the lights made it feel more like an outing like a club or an event to elevate it to be a little more special.

Another participant referenced that the dress made them feel positive and happy by expressing:

> Positively. I liked it a lot actually. I think mostly because the colors and the flowy nature of it matches my personal, things that I'm personally attracted to, I guess, or naturally

attracted to like on Pinterest or anything like that, like it just fits.

Other participants said they felt calm, while others felt weird. One of the participants stated:

> I guess like first glance it was underwhelming, but like staring more at it, it was like, the colors are nice. I actually liked the design and style of it. And of course, the lights just bringing you in to keep you looking at it. It's, I guess, calming for me. I like more of like darker colors for when I'm sleeping so that's kind of calm.

Another participant stated that they felt the dress made them feel at "First, shocked. Just like not anticipating moving lights, but it made me feel like home, kind of intrigued and comforted a little" and "relaxed."

Table 81

Coding for Viewing 3 (Lights-only) Participant Responses to Interview Q9

Code	*f*	% Total Coding	% Coder Agreement
Interest/Intrigue	13	27.66	72
Happy	9	19.15	100
Calm	8	17.02	89
Weird	8	17.02	89
Surprised	6	12.77	100
Neutral	3	6.38	100

Participant who viewed the dress with synchronized digital music and colored LED lights (viewing 4) stated that they felt mostly weird and calm as seen in Table 82. Participants who expressed feeling calm stated that they felt "calm, peaceful…when the music was coming through when I was ready to look at the rest of it, noticing how the pattern flows it just put me more at ease the longer I was looking at it." Another participant mentioned that they also felt

“very relaxed. I think just because of the flow mixed with the music and even the lights were a little bit calming as well.”

This feeling of peacefulness and calm was exemplified best by the following quote:

> Honestly just very at peace, like I felt very calm. At first, I was like it's really awkward that I'm standing here for so long…but like the music combined with the lights and just the color just brought me to a place of just peacefulness, and I just felt very ok with kind of just taking it in, and I am such a person to avoid stillness like I love going and doing things so that was like very different but felt very good.

A different participant also mentioned feeling peaceful mixed with a strange feeling by stating “it made me calm and feel a little weird. Mainly, the music made me calm and maybe the color too, but the lights made me feel a little bit weird.” Similarly, other participants stated similar emotions by saying “I guess weird” and “very I guess foggy is a good word for it, kind of like creatively foggy.”

Happiness was another emotion that participants felt when they saw the dress with both music and lights. Statements such as feeling “happy, it just made me recall memories you know of my grandma, and I like the colors purple and turquoise they are two of my favorites” and “really happy. I wanted to like go twirl in it” were affirmative that there were positive emotions felt while viewing this garment.

Table 82

Coding for Viewing 4 (Music-Lights) Participant Responses to Interview Q9

Code	*f*	% Total Coding	% Coder Agreement
Weird	12	27.91	73
Calm	11	25.58	73
Happy	8	18.60	89
Neutral	5	11.63	83
Intrigued	3	6.98	100
Sad	3	6.98	100
Surprised	1	2.33	33

Participants during viewing 1 (dress-only) expressed feeling primarily calm. Viewing 2 (music-only) participants were the happiest along with neutral feelings and viewing 3 (lights-only) participants were the most intrigued. Participants during viewing 4 (music-lights) primarily expressed feeling weird. During both viewings with lights (viewings 3 and 4), participants more frequently expressed feeling weird. A comparison of each viewing for participants' primary, secondary, and tertiary emotions can be found in Table 83.

Table 83

Participants' Answers to Interview Q9 for Viewings 1-4

Viewing	Primary Emotion	Secondary Emotion	Tertiary Emotion
Dress-only (1)	Calm	Intrigue	Springtime
Music-only (2)	Happy	Neutral	Calm
Lights-only (3)	Intrigue	Happy	Calm and Weird
Music-lights (4)	Weird	Calm	Happy

- Interview Question 10 (coded under the dress aspects and beholder aspects theme) was "Did you like the dress or not? Why?"

Participants that viewed the dress during viewing 1 (dress-only) liked the dress the most compared to the other viewings, and participants that viewed the dress with colored LED lights (viewing 3) like the dress the least. Participants that viewed the dress during viewing 2 (music-only) liked the dress a little more than those than those who viewed the dress during viewing 4 (music-lights). However, the only dress that had no dislikes was during viewing 4 (music-lights). The percentage that participants liked, somewhat like, and disliked the dress can be found in Table 84.

Table 84

Participants' Answers to Interview Q10 for Viewings 1-4

Viewing	% Liked	% Somewhat Liked	% Disliked
Dress-only (1)	91	0	9
Music-only (2)	82	0	18
Lights-only (3)	64	18	18
Music-lights (4)	73	17	0

Participants during viewing 1 (dress-only) mentioned that they liked the dress mainly due to color as shown in Table 85. Participants who mentioned that color made an impact in their liking the dress stated "I liked the colors," "I really like purple and it was purple that was used," and "I liked the dress, because it reminds you of kind of like a summer day, like the greens and the pastel colors kind of like remind you of leaves." This last statement referenced how color brought about the association of summer. Other participants also mentioned that the dress was visually appealing, wearable, and connected to personal style while unique by expressing "I think it was a fun style, it's kind of like my style, bohemian looking" and "it is definitely unique." Other participants commented that they were intrigued by the dress by saying "it made me think," "seeing fabric move is always interesting," and "it just made me mainly think." The

one participant who did not like the dress said it was not their personal style by commenting “I wouldn't wear it, and that's how I view clothes, strictly from would I wear it or would I not.”

Table 85

Coding for Viewing 1 (Dress-only) Participant Responses to Interview Q10

Code	*f*	% Total Coding	% Coder Agreement
Color	21	23.6	100
Visually Appealing/Liked	16	17.98	100
Personal Style	9	10.11	60
Association	7	7.87	78
Wearability	7	7.87	78
Interest/Intrigue	7	7.87	78
Uniqueness	6	6.74	100
Emotion/Feeling	3	3.37	50
Materials	3	3.37	100
Print/Pattern	3	3.37	100
Dress Area/Location	3	3.37	100
Movement	3	3.37	100
Visual Uncertainty	1	1.12	33

Participants who viewed the digital music dress (viewing 2) stated they liked the dress primarily due to color (see Table 86). Participants who liked the dress said “I did like the dress, yes, just because of the colors,” “yes, because it was bright, very colorful,” and “it was unique looking, I still like the color patterns on it.” A participant also mentioned that “I almost felt like a relationship with it for some reason…like I've either seen someone wear it or felt like somebody should be wearing it like out literally out in a field like chasing like going through daisies.” Other participants felt that “it's probably something I would wear” or that “I'd like to see it on my wife.” Whereas, another participant who didn’t like the dress mentioned that “it had to do with the middle part. It just didn't flow to me. The band that was around it.”

One of the participants who did not like this dress stated the following about the dress:

There wasn't much to look at. Like if I were on a date, I wouldn't want my girl to wear that dress. It just was out of place. It looked kind of messy, and I wouldn't recommend it. The random splotches of paint… and it was a dirtyish white, but mainly the splotches of paint; it didn't have any meaning to it.

Table 86

Coding for Viewing 2 (Music-only) Participant Responses to Interview Q10

Code	*f*	% Total Coding	% Coder Agreement
Color	20	23.81	95
Visually Appealing/Liked	14	16.67	71
Wearability	9	10.71	75
Association	6	7.14	100
Uniqueness	5	5.95	83
Emotion/Feeling	5	5.95	83
Movement	5	5.95	83
Visually Unappealing/Disliked	5	5.95	56
Dress Area/Location	3	3.57	100
Personal Style	3	3.57	100
Materials	3	3.57	67
Print/Pattern	3	3.57	50
Cut/Silhouette	2	2.38	50
Normal/Underwhelming	1	1.19	33

Participants who viewed the dress with colored LED lights during viewing 3 stated that they liked the dress due mainly to wearability (see Table 87). Participants mentioned that it seemed wearable by stating “I think it would look cool if somebody wore it,” “I liked it. Just the colors. I mean it's not something I necessarily see myself wearing, but it would be beautiful on someone else,” and “I did like the dress. It's a nice dress. I can see myself wearing it.” Color was another aspect that participants liked about the dress by stating “I really like that color scheme, that purple. I really like purple.” One participant stated the following about the dress’s color:

> Yes, I definitely liked it. I liked the white fabric. The fabric looked kind of like, how do I describe it? I like light colors, it kind of had some like pastel tones, I just like those colors, I like just like the texture, like the shape when a dress drapes, and also the belt for sure. I like the LED part for sure. It looks kind of linen. I wanted to touch it in a way.

Participants expressed different opinions about the lights. For instance, one participant stated that "the lighting in the middle. It threw it all off. If it didn't have the lighting, I would have loved the dress. I would purchase it," whereas another participant stated "if the lights serve a purpose technologically, it was a great execution of that to make it accessible." Another participant also mentioned "I like the LED part for sure…I wanted to touch it in a way."

As mentioned earlier, the dress during viewing 3 (lights-only) was liked the least due to the belt lighting, the "tie-dye" pattern not being a participant's personal style, only being worn for certain events, and being more conceptually stimulating than visually stimulating. In particular, one participant stated the following about the dress during viewing 3:

> I mean, ya, I guess I'm kind of in the middle on it, it sounds like. I mean just that for me it wasn't aesthetically probably as pleasing as I would have liked, but I love conceptual art so I liked that it made me think about all of these issues that we're talking about now, so I guess I liked it conceptually, but maybe visually I didn't.

Table 87

Coding for Viewing 3 (Lights-only) Participant Responses to Interview Q10

Code	*f*	% Total Coding	% Coder Agreement
Visually Appealing/Liked	16	12.7	76
Wearability	15	11.9	76
Lights	12	9.52	92
Color	11	8.73	92
Personal Style	10	7.94	60
Dress Area/Locations	9	7.14	75
Materials	6	4.76	100
Interest/Intrigue	6	4.76	67
Association	6	4.76	67
Visually Unappealing/Disliked	6	4.76	50
Cut/Silhouette	5	3.97	83
Normal/Underwhelming	5	3.97	56
Drape	4	3.17	67
Material Weight	3	2.38	100
Print/Pattern	3	2.38	100
Texture	3	2.38	100
Movement	3	2.38	67
Surprise/Excite	2	1.59	33
Emotion/Feeling	1	0.79	33

Participants during viewing 4 (music-lights) stated that they liked the dress due to color as shown in Table 88. Participants stated that they liked the color and silhouette of the dress based upon comments such as “first of all, I like the color and the shape, and it was a pretty dress. I like pastel tone and the dress was like that.” In particular, one participant stated the following about the colors:

> Ya, I would say I liked it. I keep going back to the color, but I ya, I just love all of the colors. I love that like the colors also don't stay to their very specific place like the greens on the sleeve, but it's also like randomly, there’s splotches on the right side of the dress, and it's all kind of part of the whole.

Another participant expressed a similar interest in the colors during viewing 4 as follows:

> Yes, I just thought it was really neat. The color scheme is something I would wear. And again, the fabric is something that I would wear. I have things in my closet that are a similar silhouette. I thought it was very summery, and also, just I like teal and purple together.

Other participants stated that it reminded them of spring and would be worn for a special occasion. A few participants were specific in their liking the dress, but without the belt. For instance, one participant stated “I'd like it if it didn't have the belt... I just didn't think it went well with it. I liked the colors and the fabric and how delicate it looked” and another participant similarly stated the following about the belt:

> I feel I would have liked the dress more without the lights. I feel like the lights were important for like this kind of journey to like look at the pattern of the dress, but the dress itself has such strong characteristics that are watered down because of the lights on the belt. I think I did like it as an experience, but it's not really like something that you would, I would say is streetwear like fashion with the belt.

Table 88

Coding for Viewing 4 (Music-Lights) Participant Responses to Interview Q10

Code	*f*	% Total Coding	% Coder Agreement
Color	21	18.75	100
Visually Appealing/Liked	15	13.39	71
Wearability	9	8.04	78
Dress Area/Location	8	7.14	89
Cut/Silhouette	8	7.14	89
Association	8	7.14	89
Movement	6	5.36	100
Lights	6	5.36	100
Materials	6	5.36	67
Interest/Intrigue	4	3.57	67
Personal Style	4	3.57	67
Material Weight	3	2.68	100
Emotion/Feeling	3	2.68	100
Uniqueness	3	2.68	100
Print/Pattern	3	2.68	50
Normal/Underwhelming	1	0.89	33
Surprise/Excitement	1	0.89	33
Visual Uncertainty	1	0.89	33
Visually Unappealing/Disliked	1	0.89	33
No Reaction	1	0.89	33

Participants main reason for liking the dress was due to color according to viewings 1 (dress-only), 2 (music-only), and 4 (music-lights) seen in Table 89. The primary reason for participants to like the dress during viewing 3 (lights-only) was wearability by stating that “it would look cool if somebody wore it,” “I think that's something that I would personally wear, like that I think that looks really nice, and it's very colorful,” “I mean it's not something I necessarily see myself wearing, but it would be beautiful on someone else,” and “I did like the dress. It's a nice dress. I can see myself wearing it.”

Table 89

Participants' Explanation for Answers to Interview Q10 for Viewings 1-4

Viewing	Primary Reason for Liking
Dress-only (1)	Color
Music-only (2)	Color
Lights-only (3)	Wearability
Music-lights (4)	Color

- Interview Question 11 (coded under the dress aspects and beholder aspects theme) was "Was this dress exciting or not? Please explain."

Participants expressed that the dress with colored LED lights (viewing 3) was the most exciting, whereas the dress-only during viewing 1 (dress-only) was the least exciting. Both viewings that had music (viewings 2 and 4) were similarly excited (55%), but by adding lights to the music, more participants also expressed being not as excited (36%). The comparison of participants excitement between dress viewings are shown in Table 90.

Table 90

Participants' Answers to Interview Q11 for Viewings 1-4

Viewing	% Excited	% Somewhat Excited	% Not Excited
Dress-only (1)	27	9	64
Music-only (2)	55	27	18
Lights-only (3)	82	9	9
Music-Lights (4)	55	9	36

Participants during viewing 1 (dress-only) expressed that emotion was the primary reason for their excitement towards the dress along with color listed in Table 91. One participant mentioned that the dress was "more calming based on the colors" rather than exciting. Similarly,

participants stated it was not exciting due to it not existing within their definition of exciting. For instance, a few participants described their idea of exciting by stating:

> Mmm, I don't think I would say exciting as the word I would use to describe it. It's not flashy enough to be exciting, so when you say exciting that's what I think. Flashy, bright, maybe like a totally unique pattern or like cut out of the dress, but it wasn't those things,"
>
> Other participants stated that the dress was "very visually exciting, all the colors and stuff. You could probably look at it for ten minutes and not see all of the colors.

Another participant stated that exciting meant the following:

> I wouldn't classify it as exciting, as if this is the next best thing, but it's like, if someone was like in a store and saw the dress, it would be nice. Like for my wife, I would be like "oh, that's a nice dress. You should get it." I guess, kind of exciting, but I guess exciting means different things to different people. So like exciting to me would be like getting inside a race car and going 100 miles an hour. That to me would be exciting. Heartbeat racing, that would be more exciting. This was more like soothing.

Other participants similarly stated that it failed to meet their expectations since it did not "glow" as a "light up piece" and "there's nothing particularly different about it that I think says something about fashion that I'm like "Wow!" I would have never thought of that or expected that." One participant commented that it was only "mildly exciting, I guess, just without the context it was just like ok, that's cool, it's colorful" while another stated "I'm just not interested in dresses, I guess."

Some participants however commented that “as you lean in more, you notice more things, which makes me more excited about a work of art.” The interest in the dress was described as follows:

> It was just different and unique. I wear black and solid colors, very boring colors so for me, something like that, I would never try that on. I would never like be interested in that, and so I think it's just unique for me personally. It's just got more going on. I'm trying to remember, just like the arms, there weren't just like straight across lines. There were some different, I don't want to use the word dimension. That's not right when you're talking about textiles, but dimension I guess.

Table 91

Coding for Viewing 1 (Dress-only) Participant Responses to Interview Q11

Code	*f*	% Total Coding	% Coder Agreement
Emotion	16	18.18	60
Color	12	13.64	80
Surprise/Excitement	12	13.64	57
Normal/Underwhelming	11	12.50	52
Uniqueness	7	7.95	58
Interest/Intrigue	7	7.95	47
Visually Appealing/Liked	6	6.82	56
Cut/Silhouette	4	4.55	67
Dress Area/Location	3	3.41	50
Lights	3	3.41	50
Personal Style	2	2.27	67
Print/Pattern	2	2.27	67
Visually Unappealing/Disliked	2	2.27	33
No Reaction	1	1.14	33

Participants during viewing 2 (music-only) had more excitement over the dress than those that did not feel excitement due to the dress being normal as seen in Table 92. Participants during this viewing expressed their excitement as “not necessarily with an exclamation point, but yes, mildly excited,” “50-50 Exciting,” and “the belt made it very exciting. So ya. Ya. It just has a flare…ah, ya, there's some pop, a little bit of excitement.” In particular, one participant answered the following to a question about whether the dress was exciting:

> Ya definitely, especially with the sound. It was like a nice intro to it. I kind of felt like a build up to it, because I really did not know what to expect when turning around. I thought it was more of a picture than a dress, but the music, it was soft, so it played along with the vibes of the dress.

Other participants mentioned that it was exciting based on the dress’s unique qualities by stating “I would say it was exciting. The colors and the overall style, I haven't noticed anything that looks like that before” and “Ya, I would say it was exciting mainly because it's a different dress. It's not something you see every day. Ya it was exciting.” In particular, a participant described the following about the dress with digital music:

> Yes, it doesn't look like a normal dress. It looks more like a piece of art than a dress, so like, it's more exciting than just seeing just a dress, just like seeing someone walking down the street in just a dress. Like if I saw something wearing that, I'd be like wow that's an interesting look. (laughs) So I think it was just the fact that it was art mixed with an article of clothing.

Those that thought the dress was simply normal stated “it seems like another dress to me,” and it was “just a random dress with paint on it.” However, the majority were surprised and excited by the dress. Therefore, these sentiments were not overwhelmingly shared.

Table 92

Coding for Viewing 2 (Music-only) Participant Responses to Interview Q11

Code	*f*	% Total Coding	% Coder Agreement
Surprise/Excitement	23	30.67	85
Normal/Underwhelming	7	9.33	47
Color	6	8	100
No Reaction	5	6.67	83
Uniqueness	5	6.67	83
Visually Appealing/Liked	5	6.67	83
Interest/Intrigue	4	5.33	67
Dress Area/Location	3	4	100
Movement	3	4	100
Cut/Silhouette	3	4	100
Material Weight	3	4	100
Music	3	4	100
Visual Uncertainty	2	2.67	67
Association	1	1.33	33
Emotion/Feeling	1	1.33	33
Wearability	1	1.33	33

Participants that viewed the dress during viewing 3 (lights-only) stated that they had excitement towards the dress's lights and uniqueness as shown in Table 93. Participants responses to whether the dress was exciting exclaimed that they were excited due to its thought-provoking qualities by stating "on a visceral level, I was excited by the LED light belt, and then, it's exciting talking about it now, so like it's exciting to kind of think about what it represents" and "it was very exciting… I've never seen before. For me, if it's interesting for me. It's exciting. If it's thought-provoking, it's exciting. It was thought-provoking, yes, because I wanted to know why the lighting was in the middle."

The lights in particular were very exciting to some participants. Statements such as "the lights made it exciting. I always go for glittery sparkly things so that always grabs my attention.

So, I guess that made it look like a fun time dress" and as one participant described it, the lights were exciting in the following way:

> Yes, it was exciting. It popped. The colors were very vibrant, and then the lights on the belt were very exciting. It reminded me of the same feeling with the strobe lights in a party that added to the atmosphere. It was a dress that would be worn for a particular event.

Other participants mentioned that the dress was exciting due to its uniqueness by saying "I certainly would describe it as exciting, because it's definitely not like a traditional piece of clothing," "Ya I think so. It's fun with the colors in general. I think it's something different. I always think different things are kind of fun," and "It's exciting. It just isn't common everyday clothing so it's more exciting than regular clothing I guess. I don't know, exciting isn't, that's like a strong word I guess, but ya, it's close to exciting. Mildly exciting."

Another participant mentioned being excited due to the dress's wearability by stating:

> Definitely like the most obvious things like the LED part of it, like that's really cool. It looked like practical 'cause like the thing is a lot of times you see things like art is trying to be innovative with LED stuff, but it's not practical or uncomfortable. That looks like something you could actually wear.

Interestingly, the only participant who did not find the dress exciting mentioned that it was because it reminded them of their home country of China. The following statement refers to their association to Chinese dress:

> I think it's beautiful. It's a pretty dress. It doesn't really wow me, amaze me so much. Basically, I saw this kind dress every day on the street in China. Shopping malls also

have this kind of different fashion brand in Shanghai. They all produce the same kind of like dress. Normally the dress, they have the same kind of long dress, no sleeves, all kinds of different dress. In essence, they all have same kind of similar patterns, similar textures applied to the dress. There's some kind of term for this dress, a fashion style.

Table 93

Coding for Viewing 3 (Lights-only) Participant Responses to Interview Q11

Code	*f*	% Total Coding	% Coder Agreement
Surprise/Excitement	24	25.26	80
Lights	18	18.95	100
Uniqueness	10	10.53	56
Association	7	7.37	67
Color	6	6.32	100
Dress Area/Location	6	6.32	78
Emotion/Feeling	6	6.32	50
Interest/Intrigue	5	5.26	56
Normal/Underwhelming	4	4.21	67
Visually Appealing/Liked	3	3.16	100
Wearability	3	3.16	100
Print/Pattern	1	1.05	33
Texture	1	1.05	33
Cut/Silhouette	1	1.05	33

Participants who viewed the dress during viewing 4 (music-lights) expressed their excitement in the dress mainly because of dress area/location, associations and emotion (see Table 94). Some of the participants comments were particularly insightful. For instance, one participant mentioned how "the auditory cue to turn around, it has that "I've arrived" moment, there you go, and this is a beautiful dress. It's very movie-like." Similarly, another participant commented "the lights and the music seemed to sync up really well. Ya, it was exciting at first and then it mellowed out the longer I was looking at it."

Regarding the lights, one participant's comment was that "it was exciting, because it was a combination of things you wouldn't expect. It was kind of a new approach to your everyday summer loose fitting dress. It was accessorized well. The accessory would be the belt." There were however participants that reported not experiencing excitement by saying "no, I would say it was calming if anything." Similarly, another response was "I thought of it more as calming and relaxation, I didn't get the emotion of excitement as much as I did soothing." To go along with the calm feeling, a participant mentioned "it was more laid-back. It didn't really look like, to me exciting would have been more something you would have seen on a Calvin Klein runway and that was more of like I was having lemonade enjoying the weather." Yet, another participant described the dress as "interesting, but not exciting."

Table 94

Coding for Viewing 4 (Music-Lights) Participant Responses to Interview Q11

Code	*f*	% Total Coding	% Coder Agreement
Surprise/Excitement	11	11.46	67
Dress Area/Location	10	10.42	83
Emotion/Feeling	10	10.42	75
Association	10	10.42	67
Music	9	9.38	75
Lights	8	8.33	89
Interest/Intrigue	7	7.29	58
Color	6	6.25	83
Normal/Underwhelming	6	6.25	33
Material Weight	5	5.21	83
Uniqueness	4	4.17	67
Visually Appealing/Liked	4	4.17	67
Personal Style	2	2.08	33
No Reaction	1	1.04	33
Visual Uncertainty	1	1.04	33
Wearability	1	1.04	33
Cut/Silhouette	1	1.04	33

- Interview Question 12 (coded under the dress aspects and beholder aspects theme) was "Did this dress impress you? Please explain."

Participants during viewing 4 (music-lights) were most impressed with the dress, and participants during viewing 2 (music-only) were least impressed with the dress (see Table 95). Participants during viewing 1 (dress-only) and viewing 3 (lights-only) were equally impressed, somewhat impressed, and not impressed.

Table 95

Participants' Answers to Interview Q12 for Viewings 1-4

Viewing	% Impressed	% Somewhat Impressed	% Not Impressed
Dress-only (1)	55	27	18
Music-only (2)	36	9	55
Lights-only (3)	55	27	18
Music-lights (4)	73	9	18

Participants during viewing 1 (dress-only) stated that they were impressed mainly due to the dress's uniqueness (see Table 96). Participants stated that the dress was unique and interesting in certain areas by stating "it does look hand-made so that's maybe impressive," "it was unique. I have not seen a dress like that before. The waistline was something different," and "it was unique, different, and unexpected." A participant stated the following about the dress's qualities:

> It was a very interesting dress, like you don't see a lot of dresses with the kind of fabric that it has and also the different color I think. A lot of colors are more accentuated, like they're more colorful. This is a little more pasteley, they're bright but…more muted.

In particular, one participant referenced that the dress reminded them of a butterfly by saying "I feel like it was well-designed the whole thing together. It was well-thought out, so I

thought it was impressive in that way. I feel like it really represented like a butterfly and springtime. It was very cohesive." Whereas, those who were not as impressed with the dress mentioned "it was ok…I personally like having context so… I wasn't sure what I was supposed to see so I didn't have much to go off of," "I wasn't, you know, I didn't know what to expect and it made an impression I guess," and "I'm also not a fashion person, so um, it didn't seem like it was particularly, like new or different from things I've seen before." One person referenced a fashion television show for their response by stating:

> I watch a lot of project runway (laughs), so when somebody does something really new or different with fabric that you don't expect or just that you would never think of it, you just know when you see it. It didn't do that. There was nothing about it that was different enough that made it exciting... nothing that felt new or different or anything like that. Nothing that shocked me. It looked like average. Expected.

Table 96

Coding for Viewing 1 (Dress-only) Participant Responses to Interview Q12

Code	*f*	% Total Coding	% Coder Agreement
Uniqueness	10	15.87	73
Interest/Intrigue	8	12.7	89
Dress Area/Location	7	11.11	78
Normal/Underwhelming	6	9.52	100
Materials	5	7.94	83
Surprise/Excitement	5	7.94	56
Visual Uncertainty	5	7.94	56
Association	4	6.35	67
Color	3	4.76	100
Cut/Silhouette	3	4.76	50
Visually Appealing/Liked	3	4.76	33
No Reaction	2	3.17	67
Emotion/Feeling	2	3.17	33

Participants during viewing 2 (music-only) stated that they were not impressed by the dress due to it being normal/underwhelming, whereas participants who were impressed by the dress stated it was due to liking and having an interest in the color (see Table 97). Therefore, color was an important part of the design of the dress to leave an impactful impression. Participants who were impressed stated that the dress's color made it "lively." Another participant stated that the dress "seemed like there were many different colors, but they all flowed very well together… it became a cohesive piece."

Those who were not impressed with the dress expressed how normal/overwhelming that it was by stating "I wouldn't expect this in the window of a forever 21 or something. It just didn't excite me," "I don't know. There wasn't anything impressive about it. I don't know much about design. I wasn't like blown away by like the design or anything," and "seems like a dress that could be found anywhere." One participant went into more detail as to why the dress did not impress them, and their insight follows about the dress:

> Good thoughts, but not like oh shit! You know? I mean it brings out good thoughts, but like it's creative, but not really that creative. It's a very simple dress with a lot of colors, but it's not that creative or like many things to it. You know what I'm saying? It's a very simple dress. It doesn't have the extra pockets, you know? It doesn't have pockets at all. One simple thing, the belt could be a little bit more creative. I mean, it is, but the belt could be better I think, because it has little holes in that one, but I think it could be better if it was different then a hole. I could be like maybe stars, like different shapes in the belt, 'cause it's not really shape at all.

From a different point of view, another participant expressed their pleasant surprise by the dress by sharing:

It kind of has a flare. I was impressed by it. One, I was not expecting it and for it to be like very calming and very just like gentle, I guess you can kind of say with this air moving through with the song just made the dress feel really good. I think I was expecting this portrait. Ya, I was thinking something that wasn't a dress so the dress kind of surprised me and throw the music in and looking, like all of it started coming together very like, like everything matched very well from the breeze to the dress.

Table 97

Coding for Viewing 2 (Music-only) Participant Responses to Interview Q12

Code	*f*	% Total Coding	% Coder Agreement
Color	12	17.14	100
Normal/Underwhelming	11	15.71	61
Visually Appealing/Liked	9	12.86	60
Interest/Intrigue	6	8.57	50
Emotion/Feeling	5	7.14	56
Personal Style	3	4.29	100
Surprise/Excitement	3	4.29	50
Movement	3	4.29	50
Visually Unappealing/Disliked	3	4.29	33
Music	2	2.86	67
Association	2	2.86	67
Dress Area/Location	2	2.86	67
Wearability	2	2.86	67
Visual Uncertainty	2	2.86	33
Cut/Silhouette	2	2.86	33
Uniqueness	1	1.43	33
Drape	1	1.43	33
Materials	1	1.43	33

Viewing 3 (lights-only) participants said that the dress impressed them due to the lights (see Table 98). Participants responses to the lights being intriguing and surprising include statements such as “the LED technology just kind of gave it that extra pop. It just like took it to

the next level I guess." One participant expounded on how the lights impacted their impression of the dress with the following statement:

> I think it's impressing me more and more like the more I think about it, because maybe at first, it, I would say maybe it didn't like blow me away right when I turned around and started looking at it, because even though it had like the LED elements, they're fairly small you know and then maybe like when I thought about, oh, technology in a dress, I might of thought about or anticipated something more with the technological elements, but then talking about it, I think is impressive considering what the story is behind it and what it might be saying and just how it can start a conversation like this.

Some participants however were not impressed by the dress and expressed that they thought "the lighting on it, I think the lighting on it made it ugly," or "it's too normal for me." These sentiments were not shared by others who stated "I was impressed by the belt, because the belt was unexpected, I haven't seen that before and it did flow with the dress," "the dress does a really good job of incorporating the new technology," and "somebody clearly spent a lot of time putting in the lights to be embedded into the structure of the dress."

Two participants statements in particular state further why the dress was only somewhat impressive. One participant focused on comparison to other light-up garments by stating:

> Ya, I liked it. I thought it was… I mean if it was me, because I do a lot of costuming, I would have liked to see how it was done, and I think it would have impressed me more. If I had actually gotten to look at how it was woven together, but from my quick glance, I thought it was interesting. It's interesting, but it didn't like knock my socks off kind of thing 'cause I've seen a lot of like really cool electronic costume work before that just is incredible... like when Dragon Con comes to town, just some of the stuff that people do

for that are just absolutely mind-blowing like the way they'll do LEDs that they'll go all in their clothes and their armor, or whatever and it's absolutely breath-taking so that's why I guess if I'm comparing it, that's almost like oh ya it's cool, but it's not like wow!

Another participant similarly spoke about how the dress was somewhat impressive to them simply due to wanting to know the functionality or utilitarian purpose of the lights. This participant expressed their thoughts in the following manner:

Definitely, well the dress itself probably not ‘cause it's a pretty basic garment, but the lights were only because it seemed, I don't know if impressed is really the right word, it's almost just like intriguing ‘cause in order to be impressive for me, I would need to know that the lights do something ‘cause without that it's just a dress that lights up.

Table 98

Coding for Viewing 3 (Lights-only) Participant Responses to Interview Q12

Code	*f*	% Total Coding	% Coder Agreement
Lights	19	23.17	90
Interest/Intrigue	8	9.76	53
Visually Appealing/Liked	7	8.54	78
Materials	6	7.32	100
Surprise/Excitement	6	7.32	50
Normal/Underwhelming	5	6.1	56
Association	5	6.1	56
Dress Area/Location	4	4.88	67
Uniqueness	4	4.88	44
Emotion/Feeling	4	4.88	33
Color	3	3.66	100
Cut/Silhouette	3	3.66	50
Visually Unappealing/Disliked	3	3.66	100
Print/Pattern	2	2.44	67
Movement	2	2.44	67
Visual Uncertainty	1	1.22	33

During viewing 4 (music-lights), participants mentioned that they were impressed by the dress's uniqueness (see Table 99). Participants referenced "how relaxed it made me feel" regarding their emotions. Uniqueness was also often mentioned by participants as a reason for being impressed by the dress with statements such as "ya, just because it was different. It had a light belt on," "yes, so I would definitely wear it if it was something new to test out. I love trying new things," "yes, again it's not a normal dress which I can see in the street," and "ya definitely, just its uniqueness. The way it didn't really look like I think it would look like in a store I guess." The participants who were not impressed by the dress said that they have "seen dresses like that before."

Also, participants mentioned their intrigue and surprise by the dress. For instance, participants mentioned "so many multiple pieces going on with it at once. A lot to take in" and "not initially, but when I first turned around I was like "Oh" and then as I looked at it more there was so much more to see and there was so much more to think about, and just kind of like connect." One participant in particular stated:

> Yes, it impressed me because whoever designed it was thinking outside the box with it, and it may just be meant to be on display, but it's really cool. I probably wouldn't wear it like to work or something, but I would wear it to like an event. And then sometimes, it kind of depends I guess on how it's wired and stuff as well so you may not be able to wear it outside or whatever as well.

Table 99

Coding for Viewing 4 (Music-Lights) Participant Responses to Interview Q12

Code	*f*	% Total Coding	% Coder Agreement
Emotion/Feeling	10	17.54	42
Uniqueness	7	12.28	58
Surprise/Excitement	7	12.28	39
Normal/Underwhelming	5	8.77	56
Wearability	5	8.77	56
Interest/Intrigue	5	8.77	42
Lights	3	5.26	100
Dress Area/Location	3	5.26	100
Association	3	5.26	50
Visually Appealing/Liked	3	5.26	33
Cut/Silhouette	2	3.51	67
Personal Style	2	3.51	33
No Reaction	1	1.75	33
Materials	1	1.75	33

- Interview Question 13 (coded under the museum aspects theme) was "Would you like to see more clothing like this in museums?"

Participants during viewing 1 (dress-only) were the most affirming (91% yes) in their response to see more clothing like this in museums, and viewing 3 (lights-only) was the least affirming (73% yes) in their response to see more clothing like this in museums. Participants during both viewings with music (viewings 2 and 4) were somewhat more affirming (82% yes) than participants during viewing 3 (lights-only) that they would like to see more clothing like this in museums. However, participants during viewing 4 (music-lights) were slightly more favorable than participants during viewing 2 (music-only) as shown in Table 100.

Table 100

Participants' Answers to Interview Q13 for Viewings 1-4

Viewing	% Yes	% Maybe	% No
Dress-only (1)	91	0	9
Music-only (2)	82	9	9
Lights-only (3)	73	27	0
Music-lights (4)	82	18	0

A few participants during viewing 1 (dress-only) expounded upon their want to see more dresses like the one displayed at the museum by mostly referring to specific museums/artists, historic clothing, and backstories (see Table 101). For instance, participants stated the following about wanting to see clothing in museums: "yes, well I think it's important to document from a historical perspective like what people wear" and "I would think it's cool to see a few, but I don't know if I'd be interested to see a whole exhibit." One participant in particular mentioned the following about seeing clothing in museums:

> Clothing in museums is great. I love looking at clothing in museums. I've been to several museums that have you know like old clothing that tells you about the people, especially women's clothing, tells you about women's rights and the movement at the time.

To expound upon how the participant wanted to see the clothing they remarked:

> I'd like to see the stories behind them too. So, typically when I go to a museum, I look at whatever I'm, ya know, whatever's on exhibit and make my own call and then kind of compare that to the plaque and see what I saw versus what the artist saw.

Another participant also referred to their recent experience of seeing clothing on display at another museum by stating:

> Honestly, I'd be happy to see any kind of clothing in a museum. Ya, SCAD has a really great show by like somebody I think called Guo Pei recently and that was really really

cool. Really cool. It was amazing.

Similarly, another participant referred to other clothing exhibitions by stating:

I find it fascinating, so someone who's always loved art… I think seeing other art expressions through other mediums besides what you'd typically see in museums is always really fascinating. And fashion, you know, it's like you'd see something that's like historic, something that's really old, but you don't see stuff that people are making a lot of times, modern stuff. It's not like super common in museums so I think it's really fascinating. I mean yes there's like the Fashion Institute at the Met and things like, or like the Costume Institute or whatever it's called so like it does exist but it's definitely not like a common thing you see.

Table 101

Coding for Viewing 1 (Dress-only) Participant Responses to Interview Q13

Code	*f*	% Total Coding	% Coder Agreement
Museum/Artist	9	30	60
Historic Clothing	8	26.67	89
Backstory	6	20	67
Artistic Fashion	4	13.33	67
Contemporary/Futuristic Fashion	3	10	50

Participants who viewed the dress during viewing 2 (music-only) stated that they would like to see more clothing like this in museums due mainly to a particular museum/artist and artistic fashion (see Table 102). Some participants said that they frequently visit museums that display fashion already or stated that "I don't go to museums enough, but I kind of wish I did now so … It's a nice little shock value there." Some participants mentioned an interest in seeing

clothing in museums if there was more information given, which is described in the following quote:

> Tech garments, yes, but more explanation on it. You know what I'm saying? and What it is about it, like, where is the technology? What does it do? That would be more exciting, I feel like. If I went to a technology museum, and I saw a dress, if it was this, I would look at it, but if it didn't have an explanation to it, it wouldn't be that exciting. That's why when I said 50-50, I mean it's cool, but If I saw an explanation with it, it would be better. I see it, but I need more information.

Interestingly, participants also commented on how they would like to see more clothing like this in museums, but not in public by explaining:

> Well in a museum, sure, but like out in public, no. 'Cause museums hold the whole artsy type of vibe to where anything goes. You can create pretty much put anything in a museum, and it can have a backstory to it or it could just be worth anything just based on the artistic impression that's behind it.

Another participant expressed more satisfaction in seeing an outfit that they would wear by sharing:

> I think it's interesting to see clothes in museums that we would normally wear. I feel like this is a piece that I would wear and sometimes with different pieces you kind of look at them and think there's no way I would ever wear this. Ya, exactly, I would never wear anything Lady Gaga, but it's just so interesting. You're very like intrigued by her whole being and her outfits and how she carries herself. I'd rather see things that I'd wear rather

than Lady Gaga. I think it's something more relatable. Something you see yourself wearing.

Table 102

Coding for Viewing 2 (Music-only) Participant Responses to Interview Q13

Code	*f*	% Total Coding	% Coder Agreement
Museum/Artist	12	46.15	67
Artistic Fashion	8	30.77	67
Backstory	5	19.23	56
Contemporary/Futuristic Fashion	1	3.85	33

Participants that viewed the dress during viewing 3 (lights-only) mentioned that their primary reasons for wanting to see clothing like this in a museum was primarily due to contemporary/futuristic fashion and museums/artists (see Table 103). Some participants mentioned that they needed to know the backstory behind the clothing before wanting to see more clothing like this in museums by stating, "not without knowing the purpose of it," and similarly, another participant stated:

> Well, it depends on what type of topic or what kind of demonstration you guys want to express. I think I saw one exhibition using the same kind of dress, but to express a topic about girls getting raped, the exhibition shows the clothes that a girlfriend and boys wear when they get raped, so that's one dress I think it's kind of similar to this kind of dress. So, it depends on the kind of topic that [is] trying to [be] express. I think if it's a single dress, I'm not that interest, but if it's a collection cluster of dress, and it's a very specific focus that the artist wants to express, I'd be interested.

Other participants mentioned other museums by stating “I mean they did the sneakers at the High a couple of years ago, and I thought those were pretty neat. I think it’s a very accessible form of art” and similarly a participant stated the following:

> Oklahoma Contemporary, which is a kind of art gallery we have in Oklahoma City…, we had a technology in fashion like an entire exhibit, and I missed it, and I actually really wanted to see it… but I thought that that was awesome that they had it.

Other participants shared that “Ya, I would, I like that it's close to modern like it's close enough you could see yourself wearing it, but still different enough that it's interesting.” Another participant shared a similar sentiment by stating:

> Definitely, absolutely. Ya, like I love LED stuff, when I go to a museum, when I see something that's LED, that always impresses me. But seeing it on clothing that's cool, ‘cause I can actually see people wearing that in the future. I like when museums show something that's practical.

Another participant expressed their need for contextual information. For instance, this participant shared the following:

> I guess it would depend contextually. If it was an exhibit that had clothing or electronics or some kind of marrying of fabric and electronics, I think it would fit and be fine, but at a regular museum where you have paintings and things, I don't know if it would be accepted. (because it's more traditional?) Ya, I think so. Everything that's in this gallery is a little more contemporary, and you can tell, this is made for today, from these materials, for this movement, and that's great, but if you put that in a regular [museum], like the

High or something, people would be like "What is this?" They wouldn't get it. (Exactly, context is so important).

Table 103

Coding for Viewing 3 (Lights-only) Participant Responses to Interview Q13

Code	*f*	% Total Coding	% Coder Agreement
Contemporary/Futuristic Fashion	11	36.67	83
Museum/Artist	10	33.33	67
Backstory	6	20	100
Artistic Fashion	3	10	33

Participants during viewing 4 (music-lights) stated that they would like to see more clothing in museums mainly due to particular museums/artists (see Table 104). Some of the participants' statements were "ya , absolutely, I'd like to see more clothing like that's being worn," "ya, it'd be interesting," "perhaps in art museums as just kind of abstract art that could be something interesting," and "really seeing a dress like that in a museum, it's all contingent upon the history that it's tied to, so it'd have to have some interesting back-story for me to really sink my teeth in it so to speak." One participant even referenced her previous experience by sharing the following:

> Oh my goodness, yes! I went to this incredible, it was in NYC and they had this like Japanese clothes artist I guess, who had made these incredible pieces of clothing and I just was in there for like two hours by myself taking it all in. It was so, so cool. They had wigs and big dress and big coats and they were sectioned off in different colors and things. Last summer at the Met.

Table 104

Coding for Viewing 4 (Music-Lights) Participant Responses to Interview Q13

Code	*f*	% Total Coding	% Coder Agreement
Museum/Artist	5	35.71	83
Contemporary/Futuristic Fashion	3	21.43	100
Backstory	3	21.43	100
Artistic Fashion	2	14.29	67
Historic Clothing	1	7.14	33

After the interview questions were asked, participants were given the opportunity to state additional comments that may not have been addressed earlier. Some of the responses for participants during viewing 1 (dress-only) included "it's very like modern in the shoulders. Like you can definitely see some modern influences in the design," "this whole process is cool," and "I wonder what the back of it would look like." A participant during viewing 2 (music-only) stated that "I would like to see the dress again without the glasses." Participants during viewing 3 (lights-only) said "I think it's interesting," "I'm not the most fashionable, but I do like colors," and a unique sentiment than the others as follows:

> Why a different material- a plastic and a fur material… seems to break the flow of the dress like I personally don't really like it that much. I don't think it's quite coherent with the dress. The artist could argue [that they] want to express contradiction between three different materials…. I can't really tell what the artist wants to express.

For viewing 4 (music-lights), the participants said "I thought it was really cool. I was really genuinely surprised. I was like what is this?" and "It was a cool experience."

Triangulation

After preliminary analysis of the physiological data, observational data, and interview data, further data comparison between viewing groups and triangulation of data points occurred to answer each research question (as seen in Table 105-107). These comparisons and triangulations are further discussed to address each research question below.

Table 105

Cross-referenced Interview Data to Answer Research Questions

Research Questions	Interview Questions that Answer RQs
RQ1a: Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) sensation?	1. What was your first reaction to the dress? *Viewing 1- Color* *Viewing 2- Color* *Viewing 3- Lights* *Viewing 4- Color* 2. What was the most important part of the dress? *Viewing 1- Belt** *Viewing 2- Color* *Viewing 3- Belt** *Viewing 4- Belt* and Color* **heat maps confirm belt*

(continued)

Table 105 (Continued)

Cross-referenced Interview Data to Answer Research Questions

Research Questions	Interview Questions that Answer RQs
RQ1a: Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) sensation?	3. Was there a graceful flow to the dress? *Viewing 1- 91% yes, 9% no* *Viewing 2- 100 % yes* *Viewing 3- 64% yes, 27% no* *Viewing 4- 91% yes, 9% somewhat* 4. Where did your eyes focus longest on the dress as you looked? *All viewings stated LED belt *heat maps confirm, but fixation duration times only confirm for Viewings 3 and 4 (Viewing 1- sleeves, Viewing 2- dress top)*
RQ1b: Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) knowledge?	1. What was your first reaction to the dress? *Viewing 1- Color* *Viewing 2- Color* *Viewing 3- Lights* *Viewing 4- Color* 5. What do you think is the story behind the dress? *Viewing 1- Eco-friendly/Nature* *Viewing 2- Artistic* *Viewing 3- Costume* *Viewing 4- Costume* 6. What did the dress remind you of? *Viewing 1- Nature* *Viewing 2- Time* *Viewing 3- Costume* *Viewing 4- Feminine and Costume* 7. What does the dress tell you about art itself? *Viewing 1- Diversity and Subjectivity* *Viewing 2- Diversity and Subjectivity* *Viewing 3- Diversity and Subjectivity* *Viewing 4- Diversity* 8. Did you find the dress interesting? Why? *Viewing 1- 82% yes, 9% somewhat, 9% no (color)* *Viewing 2- 82% yes, 18% no (color)* *Viewing 3- 91% yes, 9% no (lights)* *Viewing 4- 100% yes (lights)*

(continued)

Table 105 (Continued)

Cross-referenced Interview Data to Answer Research Questions

Research Questions	Interview Questions that Answer RQs
RQ1c: Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) emotion?	1. What was your first reaction to the dress? *Viewing 1- Color* *Viewing 2- Color* *Viewing 3- Lights* *Viewing 4- Color* 9. How did this dress make you feel? *Viewing 1- Calm, intrigue, springtime* *Viewing 2- Happy, neutral, calm* *Viewing 3- Intrigue, happy, calm, and weird* *Viewing 4- Weird, calm, happy* 10. Did you like the dress or not? Why? *Viewing 1- 91% liked, 9% disliked (Color)* *Viewing 2- 82% liked, 18% disliked (Color)* *Viewing 3- 64% liked, 18% somewhat liked, 18% disliked (Wearability)* *Viewing 4- 73% liked, 17% somewhat liked (Color)*
RQ2: Which sensory cues in a synesthetic dress create [digital music, colored LED lights, both, or none] a profound aesthetic experience for the beholder?	1. What was your first reaction to the dress? *Viewing 1- Color* *Viewing 2- Color* *Viewing 3- Lights* *Viewing 4- Color* 11. Was this dress exciting or not? *Viewing 1- 27% excited, 9% somewhat, 64% not* *Viewing 2- 55% excited, 27% somewhat, 18% not* *Viewing 3- 82% excited, 9% somewhat, 9% not* *Viewing 4- 55% excited, 9% somewhat, 36% not* 12. Did this dress impress you? Please explain. *Viewing 1- 55% impressed, 27% somewhat, 18% not* *Viewing 2- 36% impressed, 9% somewhat, 55% not* *Viewing 3- 55% impressed, 27% somewhat, 18% not* *Viewing 4- 73% impressed, 9% somewhat, 18% not* 13. Would you like to see more clothing like this in museums? *Viewing 1- 91% yes, 0% maybe, 9% no* *Viewing 2- 82% yes, 9% maybe, 9% no* *Viewing 3- 73% yes, 27% maybe, 0% no* *Viewing 4- 82% yes, 18% maybe, 0% no*

(continued)

Table 105 (Continued)

Cross-referenced Interview Data to Answer Research Questions

Research Questions	Interview Questions that Answer RQs
RQ3a: Which beholder's response through sensation results in a profound aesthetic experience?	1. What was your first reaction to the dress? *Viewing 1- Color* *Viewing 2- Color* *Viewing 3- Lights* *Viewing 4- Color* 2. What was the most important part of the dress? *Viewing 1- Belt** *Viewing 2- Color* *Viewing 3- Belt** *Viewing 4- Belt* and Color* **heat maps confirm belt* 3. Was there a graceful flow to the dress? *Viewing 1- 91% yes, 9% no* *Viewing 2- 100 % yes* *Viewing 3- 64% yes, 27% no* *Viewing 4- 91% yes, 9% somewhat* 4. Where did your eyes focus longest on the dress as you looked? *All viewings stated LED belt *heat maps confirm, but fixation duration times only confirm for Viewings 3 and 4 (Viewing 1- sleeves, Viewing 2- dress top)* 11. Was this dress exciting or not? *Viewing 1- 27% excited, 9% somewhat, 64% not* *Viewing 2- 55% excited, 27% somewhat, 18% not* *Viewing 3- 82% excited, 9% somewhat, 9% not* *Viewing 4- 55% excited, 9% somewhat, 36% not* 12. Did this dress impress you? Please explain. *Viewing 1- 55% impressed, 27% somewhat, 18% not* *Viewing 2- 36% impressed, 9% somewhat, 55% not* *Viewing 3- 55% impressed, 27% somewhat, 18% not* *Viewing 4- 73% impressed, 9% somewhat, 18% not* 13. Would you like to see more clothing like this in museums? *Viewing 1- 91% yes, 0% maybe, 9% no* *Viewing 2- 82% yes, 9% maybe, 9% no* *Viewing 3- 73% yes, 27% maybe, 0% no* *Viewing 4- 82% yes, 18% maybe, 0% no*

(continued)

Table 105 (Continued)

Cross-referenced Interview Data to Answer Research Questions

Research Questions	Interview Questions that Answer RQs
RQ3b: Which beholder's response through knowledge results in a profound aesthetic experience?	1. What was your first reaction to the dress? *Viewing 1- Color* *Viewing 2- Color* *Viewing 3- Lights* *Viewing 4- Color* 5. What do you think is the story behind the dress? *Viewing 1- Eco-friendly/Nature* *Viewing 2- Artistic* *Viewing 3- Costume* *Viewing 4- Costume* 6. What did the dress remind you of? *Viewing 1- Nature* *Viewing 2- Time* *Viewing 3- Costume* *Viewing 4- Feminine and Costume* 7. What does the dress tell you about art itself? *Viewing 1- Diversity and Subjectivity* *Viewing 2- Diversity and Subjectivity* *Viewing 3- Diversity and Subjectivity* *Viewing 4- Diversity* 8. Did you find the dress interesting? Why? *Viewing 1- 82% yes, 9% somewhat, 9% no (color)* *Viewing 2- 82% yes, 18% no (color)* *Viewing 3- 91% yes, 9% no (lights)* *Viewing 4- 100% yes (lights)* 11. Was this dress exciting or not? *Viewing 1- 27% excited, 9% somewhat, 64% not* *Viewing 2- 55% excited, 27% somewhat, 18% not* *Viewing 3- 82% excited, 9% somewhat, 9% not* *Viewing 4- 55% excited, 9% somewhat, 36% not* 12. Did this dress impress you? Please explain. *Viewing 1- 55% impressed, 27% somewhat, 18% not* *Viewing 2- 36% impressed, 9% somewhat, 55% not* *Viewing 3- 55% impressed, 27% somewhat, 18% not* *Viewing 4- 73% impressed, 9% somewhat, 18% not*

(continued)

Table 105 (Continued)

Cross-referenced Interview Data to Answer Research Questions

Research Questions	Interview Questions that Answer RQs
RQ3b: Which beholder's response through knowledge results in a profound aesthetic experience?	13. Would you like to see more clothing like this in museums? *Viewing 1- 91% yes, 0% maybe, 9% no* *Viewing 2- 82% yes, 9% maybe, 9% no* *Viewing 3- 73% yes, 27% maybe, 0% no* *Viewing 4- 82% yes, 18% maybe, 0% no*
RQ3c: Which beholder's response through emotion results in a profound aesthetic experience?	1. What was your first reaction to the dress? *Viewing 1- Color* *Viewing 2- Color* *Viewing 3- Lights* *Viewing 4- Color* 9. How did this dress make you feel? *Viewing 1- Calm, intrigue, springtime* *Viewing 2- Happy, neutral, calm* *Viewing 3- Intrigue, happy, calm, and weird* *Viewing 4- Weird, calm, happy* 10. Did you like the dress or not? Why? *Viewing 1- 91% liked, 9% disliked (Color)* *Viewing 2- 82% liked, 18% disliked (Color)* *Viewing 3- 64% liked, 18% somewhat liked, 18% disliked (Wearability)* *Viewing 4- 73% liked, 17% somewhat liked (Color)* 11. Was this dress exciting or not? *Viewing 1- 27% excited, 9% somewhat, 64% not* *Viewing 2- 55% excited, 27% somewhat, 18% not* *Viewing 3- 82% excited, 9% somewhat, 9% not* *Viewing 4- 55% excited, 9% somewhat, 36% not* 12. Did this dress impress you? Please explain. *Viewing 1- 55% impressed, 27% somewhat, 18% not* *Viewing 2- 36% impressed, 9% somewhat, 55% not* *Viewing 3- 55% impressed, 27% somewhat, 18% not* *Viewing 4- 73% impressed, 9% somewhat, 18% not* 13. Would you like to see more clothing like this in museums? *Viewing 1- 91% yes, 0% maybe, 9% no* *Viewing 2- 82% yes, 9% maybe, 9% no* *Viewing 3- 73% yes, 27% maybe, 0% no* *Viewing 4- 82% yes, 18% maybe, 0% no*

Table 106

Cross-referenced Observational-Physiological Data to Answer Research Questions

Research Questions	Observations
RQ1a: Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) sensation?	• Approach *Viewing 1- 36% yes, 64% no* *Viewing 2- 18% yes, 82% no* *Viewing 3- 64% yes, 36% no* *Viewing 4- 27% yes, 73% no* **All viewings-no avoidance* • Tactile Response *Viewing 1-0%* *Viewing 2-9%* *Viewing 3-0%* *Viewing 4-0%* • Time Observing the Dress *Viewing 1- 41.97 seconds* *Viewing 2- 26.49 seconds* *Viewing 3- 30.89 seconds* *Viewing 4- 36.20 seconds* • Galvanic Skin Response/EDA *Viewing 1- 16.59 microsiemens* *Viewing 2- 19.59 microsiemens* *Viewing 3- 3.96 microsiemens* *Viewing 4- 14.71 microsiemens*
RQ1b: Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) knowledge?	• Time Observing the Dress *Viewing 1- 41.97 seconds* *Viewing 2- 26.49 seconds* *Viewing 3- 30.89 seconds* *Viewing 4- 36.20 seconds*
RQ1c: Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) emotion?	• Facial Expressions *Viewing 1-* *73% straight-faced, 36% smile, 9% slight frown* *Viewing 2-* *55% straight-faced, 36% smile, 9% slight frown, 9% raised eye-brows, 18% pressed lips* *Viewing 3-* *55% straight-faced, 55% smile, 9% slight frown, 9% squint, 9% laugh* *Viewing 4-* *82% straight-faced, 36% smile*

(continued)

Table 106 (Continued)

Cross-referenced Observational-Physiological Data to Answer Research Questions

Research Questions	Observations
RQ2: Which sensory cues in a synesthetic dress create [digital music, colored LED lights, both, or none] a profound aesthetic experience for the beholder?	• Facial Expressions *Viewing 1-* *73% straight-faced, 36% smile, 9% slight frown* *Viewing 2-* *55% straight-faced, 36% smile, 9% slight frown, 9% raised eye-brows, 18% pressed lips* *Viewing 3-* *55% straight-faced, 55% smile, 9% slight frown, 9% squint, 9% laugh* *Viewing 4-* *82% straight-faced, 36% smile* • Approach *Viewing 1- 36% yes, 64% no* *Viewing 2- 18% yes, 82% no* *Viewing 3- 64% yes, 36% no* *Viewing 4- 27% yes, 73% no* **All viewings-no avoidance* • Tactile Response *Viewing 1-0%* *Viewing 2-9%* *Viewing 3-0%* *Viewing 4-0%* • Time Observing the Dress *Viewing 1- 41.97 seconds* *Viewing 2- 26.49 seconds* *Viewing 3- 30.89 seconds* *Viewing 4- 36.20 seconds* • Galvanic Skin Response/EDA *Viewing 1- 16.59 microsiemens* *Viewing 2- 19.59 microsiemens* *Viewing 3- 3.96 microsiemens* *Viewing 4- 14.71 microsiemens*

(continued)

Table 106 (Continued)

Cross-referenced Observational-Physiological Data to Answer Research Questions

Research Questions	Observations
RQ3a: Which beholder's response through sensation results in a profound aesthetic experience?	• Approach *Viewing 1- 36% yes, 64% no* *Viewing 2- 18% yes, 82% no* *Viewing 3- 64% yes, 36% no* *Viewing 4- 27% yes, 73% no* **All viewings-no avoidance* • Tactile Response *Viewing 1-0%* *Viewing 2-9%* *Viewing 3-0%* *Viewing 4-0%* • Time Observing the Dress *Viewing 1- 41.97 seconds* *Viewing 2- 26.49 seconds* *Viewing 3- 30.89 seconds* *Viewing 4- 36.20 seconds* • Galvanic Skin Response/EDA *Viewing 1- 16.59 microsiemens* *Viewing 2- 19.59 microsiemens* *Viewing 3- 3.96 microsiemens* *Viewing 4- 14.71 microsiemens*
RQ3b: Which beholder's response through knowledge results in a profound aesthetic experience?	• Time Observing the Dress *Viewing 1- 41.97 seconds* *Viewing 2- 26.49 seconds* *Viewing 3- 30.89 seconds* *Viewing 4- 36.20 seconds*
RQ3c: Which beholder's response through emotion results in a profound aesthetic experience?	• Facial Expressions *Viewing 1-* *73% straight-faced, 36% smile, 9% slight frown* *Viewing 2-* *55% straight-faced, 36% smile, 9% slight frown, 9% raised eye-brows, 18% pressed lips* *Viewing 3-* *55% straight-faced, 55% smile, 9% slight frown, 9% squint, 9% laugh* *Viewing 4-* *82% straight-faced, 36% smile*

Table 107

Compilation of Physiological and Observational Data Across Viewings

Sensory Cue Viewing	EDA	Viewing Time	Approach	Tactile Response	Facial Expression
Dress-only (1)	16.59 µS	41.97 seconds	36%	0%	73% straight-faced 36% smile, 9% slight frown
Music-only (2)	19.59 µS	26.49 seconds	18%	9%	55% straight-faced, 36% smile, 9% slight frown, 9% raised eye-brows, 18% pressed lips
Lights-only (3)	3.96 µS	30.89 seconds	64%	0%	55% straight-faced, 55% smile, 9% slight frown, 9% squint, 9% laugh
Music-light (4)	14.71 µS	36.20 seconds	27%	0%	82% straight-faced, 36% smile

Utilizing the data shown above, the following research questions were addressed to determine the beholder's sensation, knowledge, emotion, and aesthetic experience from viewing a synesthetic dress.

- ***RQ1a*:** Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) sensation?

The results suggest that music-only (viewing 2) synesthetic dress sensory cues enabled participants to experience the most sensation. This was concluded based upon triangulation of

various data points. For instance, participants unanimously stated that the dress with music provided the most graceful-flow. Participants also expressed that the fabric colors were the most important part of this dress, which was also an integral aspect to their first reaction to the dress. Therefore, color was an important contributing factor to the participants' sensory experience of the dress. Thus, the color combinations visualized on the silk painted dress seemed to have harmonized with the musical sounds in the dress to provide the gestalt (overall) impression of a graceful-flow.

Additionally, participants during viewing 2 (music-only) mentioned that they focused longest on the belt, colors, and sleeves of this dress. However, this group of participants took longer than other participants to initially fixate on the belt as compared to the other group of participants, and participants during viewing 2 (music-only) did not view the belt for very long when they did look at the dress overall. Instead, according to the heat maps, participants during viewing 2 (music-only) had the most overall fixations on the entire dress. This suggests that the belt did not distract viewers from visually scanning the entire dress as a whole. In essence, overall sweeping eye fixations created a more enjoyable sensory experience for viewers rather than viewers' remaining fixated only on one element of the dress such as the belt alone.

This group of participants also exhibited observational behaviors of pressed-lips, raised eyebrows, tactile response, and shortest viewing time which were unique behaviors exhibited only by participants during viewing 2 (music-only) as compared to participants during the other viewings. Participants during viewing 2 (music-only) were also the only group to have an overall positive change in EDA thereby indicating that everyone in this group of participants was aroused during the viewing of the dress, which according to Berlyne's (1971) Wundt Curve was more pleasing as validated by interview data triangulation.

Conversely, the colored LED lights (viewing 3) synesthetic dress sensory cues provided the lowest EDA arousal response, and participants during this viewing experienced the least sensation mainly due to the lights being too intense, interrupting the flow, and being too much to focus on with the fabric according to participants.

- ***RQ1b*:** Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) knowledge?

The data suggests that the music with colored LED lights (viewing 4) synesthetic dress sensory cues allowed participants to exhibit the most cognitive stimulation (knowledge). This was concluded due to participants stating that this dress was unanimously the most interesting as compared to the music-only viewing (2) which was the least interesting. According to participants during viewing 4 (music-lights), participants first reaction to the dress was to its color, and the lights were the aspect that made the dress interesting. This group of participants were also the only ones to mention that the dress told them that art is primarily about diversity more so than subjectivity since the dress had diverse multisensory cues that incorporated both fashion and technology.

In addition, this group of participants during viewing 4 (music-lights) expressed that the story behind the dress and what the dress reminded them of was related to feminine costume as compared to participants in viewing 2 (music-only) who stated the story behind the dress was nothing. Aspects of fantasy and creativity associated with feminine costume may have made the dress more interesting as participants mentioned thinking of Arwen from Lord of the Rings as well as creatively made-up characters such as an outer-space princess.

Participants facial expressions during viewing 4 (music-lights) were mainly straight-faced denoting contemplation as this group of participants had the second longest viewing time.

These participants also fixated immediately and longest on the colored LED light belt indicating they were possibly trying to understand the purpose as well as functionality of this area of the dress. These behaviors of verbally expressing interest in the dress, straight-faced expressions, and longest viewing time indicate that there was more cognitive processing involved among participants during viewing 4 (music-lights) than other participant groups.

- ***RQ1c*:** Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create optimal (moderate) emotion?

The data suggests that the dress-only synesthetic dress during viewing 1 was the most liked in comparison to the least liked lights-only (viewing 3) synesthetic dress sensory cues, whereby participants during viewing 1 of the dress-only had exhibited behaviors of heightened pleasant emotion. Participants' first reaction to the dress-only during viewing 1 was due to the fabric color, which is also why participants stated they liked the dress. Therefore, color was impactful to participants emotions in liking the dress.

In particular, participants that most liked the dress-only (viewing 1) felt primarily calm due to the fabric colors as compared to participants during viewing 3 (lights-only) who least liked the dress, but felt intrigued due to the colored LED lights. Therefore, the feeling of calmness was liked more than intrigue. Participants who liked the dress the most had facial expressions that were mostly straight-faced as well as some smiles, which could denote a pleasantly calm demeanor. It is also interesting to note that participants during viewing 1 (dress-only) had the second highest EDA arousal response denoting that they emotionally enjoyed the dress as an automatic response.

- ***RQ2*:** Which sensory cues in a synesthetic dress [digital music, colored LED lights, both, or none] create a profound aesthetic experience for the beholder?

Although no single viewing of the dress with or without unique sensory cues (with music, colored LED lights, both, or none) produced a profound aesthetic experience, the dress with both music and lights was the most impressive to participants. In considering that participants during viewing 1 (dress-only) stated they would most like to see more clothing like this in museums, this group also expressed that the dress was the least exciting compared to how other participant groups felt about the dress. This is probably due to this group primarily feeling calmness instead of a profound wow-factor experience to be impressed with the dress. Also, participants during viewing 2 (music-only) expressed that the dress did not created a profound aesthetic experience due to being the least impressed by the music-only sensory cue in comparison to the other participant groups.

Participants stated that the synesthetic dress colored LED lights (viewing 3) sensory cues were the most exciting for a wow factor effect. However, these participants also had the most contradictory low EDA arousal response and expressed that they would least like to see more clothing like this in museums. Thus, the colored LED light sensory cues alone did not create a profound aesthetic experience. However, participants were most impressed, or "wowed," by the dress displaying both the music and colored LED light cues together, whereby creating an aesthetic experience that should be further examined. These results indicate that diverse multisensory cues (i.e., music and colored lights) can provide a more impactful aesthetic experience so viewers can be ultimately impressed.

- ***RQ3:*** Which beholder's response through a) sensation, b) knowledge, and c) emotion results in a profound aesthetic experience?

Since participants during viewing 4 (music-lights) were the most impressed with the combination of the music with colored LED lights as mentioned while answering research

question 2, this participant groups' sensation, knowledge and emotion responses were further examined to determine the gestalt overall impression of their being impressed ("wowed") during the aesthetic experience. Most participants, except for one, that viewed the music with colored LED lights synesthetic dress were aroused with an increase in EDA creating a positive sensational response. The majority of these participants experienced arousal according to Berlyne's (1971) Wundt curve despite not being optimally aroused through sensation (i.e., where everyone had an arousal experience) like participants during the music-only viewing who all experienced an increase in EDA.

Furthermore, participants stated overall that they felt there was a graceful flow to the dress during the music-lights viewing, which indicates that there was sensory enjoyment of the dress according to Shimamura (2013). Therefore, EDA (i.e., increased arousal) data used in conjunction with Berlyne's (1971) Wundt curve and interview data about the graceful flow of an artwork from Shimamura's (2013) questions for being at the museum point towards participants having sensation enjoyment of the music-lights synesthetic dress. In particular, participants enjoyed primarily fixating immediately and for the longest amount of time on the belt. An explanation for this is that participants stated that they felt the belt was one of the most important parts of the dress. In reference to the formal qualities of the artwork, the belt would be considered a focal point with multiple sensory cues for pleasurable sensation.

In addition, the participants' sensation towards the dress with music-lights was to reacted first to color, spend the second to the longest amount of total time viewing the dress, and had some approach behaviors. Therefore, these participants' sensory responses were mainly of engagement and arousal during viewing 4 of the dress. Additionally, approach behaviors as well

as prolonged viewing time suggest a liking or interest in the artwork as opposed to avoidance behaviors or a quick glance at the artwork.

It is important to note that participants during viewing 4 (music-lights) had the most heightened knowledge experience out of all the viewing groups. Participants during viewing 4 (music-lights) mentioned that this dress was the most interesting due to the lights. These participants also mentioned their imaginative contemplation of the meaning behind the dress was feminine costume.

Meanwhile, participants during the viewing of the music-lights synesthetic dress discussed how the meaning of art was primarily about diversity such as the dichotomy of fashion merged with technology to create an artwork. As such, museum artworks made from diverse materials generate greater cognitive interest, since viewers try to conceptually understand the combination of very distinct categories of information (e.g., fashion-related information and technology-related information). This informs on the importance of engaging beholder cognition during the viewing of an artwork since this participant group found the dress the most interesting.

Regarding emotion, participants were observed to have mainly straight-faced expressions with some intermixed smiles, which was triangulated with participants mentioning that they mainly liked the music-lights dress in order to confirm that pleasant emotions were experienced. In particular, participants expressed that they felt weird, calm, and happy, which were overall pleasant emotions. The comment of feeling weird was connected to the lights, which happened to be the sensory cue that stimulated the most interest in the dress. As such, the lights acted as a novel element within the familiar dress. Overall, there were many pleasant emotions expressed

during the viewing of this dress, but it was not as well-liked as the dress-only viewing of the synesthetic dress.

Conversely to the music-lights dress, the lights-only viewing was the least stimulating to participants having the lowest EDA arousal levels, least liked, least graceful-flow, and least to be wanted in museums. However, this group of participants had the most approach responses, which is contradictory to approach behavior indicating enjoyment or pleasure. Therefore, further research needs to be conducted to determine if perhaps the reasoning for approach behavior was because the stimuli was the most exciting to investigate further.

In looking across all viewings, Tables 108 and 109 further summarize how each research question was addressed according to correlations inferred from the data regarding beholder's elevated SKE states during viewings of certain multisensory cues. For instance, the music-only condition created the most sensation and was addressed using research question 1a (see Table 108). Also, Table 109 gives a summary of how each participant group responded as a whole to each sensory cue for a more holistic viewpoint. For instance, the overall aesthetic experience of viewers during the dress-only viewing were only partially rather than fully impressed suggesting that the beholder's sensation, knowledge, and emotion experiential states may have contributed to this gestalt (entire) experience.

It is interest to note that viewers of the music-light dress were the most impressed, but the sound-only dress was least impressive with possible explanations for each (e.g., EDA levels, etc.) shown in these tables. Furthermore, the dress-only viewing provides interesting insight, since it was commented to be most liked, but least exciting. This suggests that the dress-only was typical (i.e., not novel) for a dress since it was liked (as most familiar stimuli are liked from ease of processing), but not very exciting due to being a relatively less complex visual stimulus.

Table 108

Beholders' SKE and Sensory Cues that Addressed Research Questions

Sensory Cue Viewing	Sensation	Knowledge	Emotion	Aesthetic Experience
Dress-only (1)			*RQ1c*	
Music-only (2)	*RQ1a*			
Lights-only (3)				
Music-light (4)		*RQ1b*		*RQ2 & 3*

Table 109

Variable-specific Pertinent Data

Sensory Cue Viewing	Sensation	Knowledge	Emotion	Aesthetic Experience
Dress-only (1)		(Longest viewing time)	Most liked (calm) with second most EDA arousal	Partially impressed: second most EDA arousal, most liked, least exciting, most wanted to see in museums, longest viewing
Music-only (2)	Most graceful flow with greatest EDA arousal	Least interesting with shortest viewing time		Least impressed: heightened sensation with limited knowledge
Lights-only (3)	Least graceful flow with least EDA arousal		Least liked (intrigued)	Partially impressed: least graceful flow, least EDA arousal, least liked, most exciting, least wanted to see in museums
Music-light (4)		Most interesting with second longest viewing time		Most impressed: most interesting with second longest viewing

CHAPTER 5. DISCUSSION

Fashion, Art, and Costume

This study aimed for a holistic perspective regarding the aesthetic experience that a synesthetic dress's sensory cues have on the beholder. Therefore, three major thematic categories emerged from the data during the story aspects thematic coding process for interview questions 5-7. Answers to these questions helped to develop a framework for defining dress as either fashion, art, or costume. These distinctions are important and contribute to the literature for further defining apparel terminology similar to how Eicher and Sumberg (1995) defined the difference between clothing, dress, and fashion.

The unique distinction between fashion, art, and costume suggests a possible relationship connected to different sensory cues in the dress. For instance, the dress-only with no additional sensory cues created the perception of fashion especially due to participants' responses that the dress reminded them of certain fashions such as hippies or zoot suits. In addition, these exemplar quotes for the fashion theme help identify the dress-only as "something that like could be an upcoming trend, like a fashion trend" and "the person who maybe created the dress maybe somebody who would be interested not only in fashion, but also in someone being comfortable. I think comfortable, nice attire that's fashionable and can be worn in multiple…. It's not extremely formal, but you could wear it just about anywhere." This distinction that fashion is about trends, comfortability, and practicality is unique to the absence of sensory cues (i.e., sound and light).

The music-only dress cue referenced art as "a thing of beauty, an object of beauty" as "art clothes, but it's high fashion" similar to couture garments enjoyed for aesthetics rather than the practicality of everyday use. Thus, there may be a strong association between the sensory cue of music to the perception of an object being artistic in nature, since music is considered an artform.

Contrastingly, dresses that utilized colored LED lights were considered costume for dressing up either for a movie, costume party, or festival wear. For instance, a dress with lights would be in a "movie that was taking place in the future, well into like 2040s," "moon ride…[where] people get all dressed up with light," or "a party, like for a costume type of party."

These distinctions between clothing as fashion, art, or costume are important due to their uses and contexts. These distinctions are useful for various apparel contexts such as whether a garment is being sent down the runway, in an apparel storefront, on stage at a concert, or in a museum context. In addition, distinctions between the beholder's perception of fashion, art, and costume may be applied to other contexts that require the ambiance of being fashionable compared to artistic or theatrical, such as retailers branding strategies for storefronts and online websites.

Furthermore, this research advances our present understanding of atmospherics on beholder aesthetic experiences (Fiore, & Kimle, 1997), since clothing can now incorporate music and light. Multisensory atmospherics such as lighting combined with music to evoke mood (Bell & Ternus, 2012) can drastically alter beholder perceptions whether in-person at a museum, concert, or clothing retailer. Outside of the context of this study, online experiences may also be enhanced for retailer-shoppers and museum-visitors using certain sensory cues.

According to traditional atmospherics research (Bell & Ternus, 2012; Fiore & Kimle, 1997), retailers should use as many multi-sensory cues to entice the viewers senses. However, this research suggests that there is either an all or none approach to sensory cues depending on the desired elicited experience. For example, not using additional multi-sensory cues can promote an ambiance of "fashion" rather than "theatrics" so that viewers will look longer and want to see more. This may be due to honing in solely to the visual attributes of the stimuli.

Therefore, the object itself holds its own without additional cues. By eliminating additional cues, this should increase shoppers' or museum visitors' viewing times.

However, the use of all sensory cues may promote more feelings of interest and being impressed due to the "theatrics" involved with the theme of costume. Moreover, online museums should consider the addition of music for a more "artsy" experience. However, the addition of music may diminish their liking of the art since music has strong connections to both positive and negative emotions (Fiore & Kimle, 1997). Thus, the appropriate music should be selected.

Optimum Stimulation Level

In discussing multiple sensory experiences, Optimum Stimulation Level (OSL) research can be applied to the present study (Fiore et al., 2001; Raju, 1980). OSL is an individual's preferred extent of arousal from an object, and high OSL individuals crave new stimuli to explore, whereas low OSL individuals avoid new stimuli in preference for the familiar (i.e. typical or not novel; Fiore et al., 2001; Raju, 1980). The central concept of OSL is that each individual has a certain preferred optimum amount of simulation (e.g., novelty, complexity, etc.), which can be adjusted (e.g., below optimum stimulation is attempted to be increased and above optimum stimulation is attempted to be reduced). With the incorporation of this theory, some of the key results are discussed further using OSL theory.

According to the results, the dress-only participants were low OSL individuals as they seemed to enjoy exploring an object of familiarity (i.e., a dress without music and lights). This is evidenced by their liking this dress the most, having the longest viewing times, having increased EDA responses, and wanting to see more clothing like this in museums. It is possible that the music-only participants were a mixture of low and high OSL individuals as these participants

had the shortest viewing time, least interested, and least impressed along with contrastingly verbalizing this dress had the most graceful flow with the greatest EDA arousal response.

The lights-only participants were low OSL individuals who wanted to avoid the new stimuli and enjoy the familiar. The novelty of the lights-only caused these participants to be least intrigued, like the stimuli least, least wanted to see more clothing in museums, have the lowest EDA arousal response, and respond with the least graceful-flow comments. Finally, the music-lights participants were high OSL individuals who wanted to explore the new stimuli within the dress by stating that this dress was the most impressive, most interesting, had the second longest viewing time, and the majority had an increased EDA arousal response.

Lights-only dress participants were the most excited, had the lowest EDA arousal, and had the least desired to see more clothing in museums, which suggests that these participants had a low OSL by avoiding new stimuli. However, when music was added to the lights, participants were most impressed by this dress. Similar to watching a 4D movie, the diverse multisensory dress cues reinforced various modes of experiencing the dress whether visually, tactilely, or audibly. Therefore, music-lights participants were high OSL individuals wanting to explore a new stimulus, which offered the most multi-sensory experience. These inferences as to whether participants were low OSL or high OSL individuals are based upon their reactions to the dress's stimulus level (i.e., enjoyment of fewer multisensory cues is a low OSL individual compared to enjoyment of more complex multi-sensory cues is a high OSL individual) seen in Table 110.

Table 110

OSL Theoretical Application to Data

Sensory Cue Viewing	Low OSL Individuals	High OSL Individuals
Dress-only (1)	Enjoyment of the familiar	
Music-only (2)	Enjoyment of the familiar	Enjoyment of the novel
Lights-only (3)	Enjoyment of the familiar	
Music-lights (4)		Enjoyment of the novel

Color and Light Sensory Cues in Design

Since color was specified as an important design element for most viewers when asked about the first reaction to the dress and the most important part of the dress, these results support the importance of color as a powerful design element. This is because color combinations are essentially what is being visualized to give a color gestalt (i.e., overall color impression) of an object (Hard & Sivik, 2001). The light-only participants were the only participants that did not express that color was the most important part of the dress (e.g., the belt was most important) nor their first reaction to the dress (e.g., the lights created the first reaction). Therefore, all viewings except for lights-only had more references to color. This suggests that lights draw attention away from textile colors as a strong visual cue. Therefore, designers should keep this in mind when utilizing lights alone without music.

Furthermore, the results of lighting perceived as interesting in comparison to other sensory cues is unique and novel information obtained through this study. Lights were the multisensory cue that prompted associations with costume, which references Cosplay (i.e., costume play) where individuals dress up as animation characters and wear costumes with colored LED lights (Tse, Esposito, & Soufani, 2016). Therefore, Cosplay character costume designers and wearers should consider incorporating both music and lighting into their outfits to stimulate viewer interest.

Emotion and Color

Data from the dress-only viewing suggested that participants had the most pleasing emotions due to participants liking the dress since color was the first reaction. Therefore, color was impactful to participants emotions in liking the dress, which supports the literature that color evokes emotion (Fiore, 2010). Regarding emotion, participants that most liked the dress-only

(viewing 1) felt primarily calm due to the fabric colors as compared to participants during viewing 3 (lights-only) who least liked the dress, but felt intrigued due to the colored LED lights. These reported feelings are categorized uniquely according to Silvia (2012) where calm emotions are categorized as a positive emotion (e.g., contentment) compared to intrigue which is a knowledge emotion (e.g., interest).

With further delineation between pleasant and unpleasant emotions, Desmet (2002) category of emotions would place calm under the pleasant emotion category (e.g., satisfaction and pleasant surprise) and the intrigue response would be in this context an unpleasant emotion (e.g., unpleasant surprise). Therefore, a more pleasant emotion (i.e., calm) was experienced during viewing 1 with the dress-only than emotions (i.e., intrigue) experienced during viewing 3 of the dress with lights-only. This may be due to the strain by participants to emotionally enjoy a more stimulating and cognitively engaging stimuli, which leads in to the next section.

Cognitive Interest

Since participants during the dress-only viewing most wanted to see clothing like this in museums and expressed that the dress was the least exciting, this is probably due to this group primarily feeling calmness instead of a profound wow-factor experience to be impressed with the dress. Therefore, the dress with no additional sensory cues allowed participants to calmly and more easily process the simplistic dress-only stimulus, because it was more typical (i.e., not novel). This supports the literature that higher ease of processing fluency allows for a more positive affective response (Reber et al., 2004).

Since participants that viewed the music-lights synesthetic dress discussed how art is about diverse materials and felt the dress was most interesting, museum curators should consider displaying artworks created from diverse materials to increase viewer interest. Also, the unique

experience of being impressed by an artwork may be due to the extent of novelty associated with the diverse sensory cues within the dress and the ease of processing these cues. As mentioned earlier, there is an ideal correlation between novelty and familiarity (Berlyne, 1971), which participants during viewing 4 (music-lights) seemed to experience since these participants viewed a familiar dress with novel sensory cues. It may be that since this dress overwhelmingly resembled a dress with only a few novel technological accessories that participants felt comfortable in processing the garment and enjoyed the dress due to the ease of processing fluency (Shimamura, 2013; Silvia, 2012; Reber et al., 2004).

Since participants during viewing 4 (music-lights) had heightened knowledge with the second longest viewing time, fixating immediately and longest on the colored LED light belt, and verbally expressed the most interest in the dress, these actions indicated more cognitive processing by moving past deciding whether the artwork deserved longer attention to savoring the artwork (Smith & Smith, 2001). This is supported according to Leder et al. (2004) since cognitive processing during an aesthetic experience is extensive and more time consuming due to the involvement of several phases during information processing such as classification, cognitive mastering, and evaluation.

Emotive Cognition Connected to Impression Formation Theory

Participants that expressed the emotion of feeling weird did so in regards to the lights, which acted as a novel element within the familiar dress. Therefore, the cognitive processing of a familiar object (i.e., dress) with novel cues (i.e., lights) creates what Silvia (2012) considers as knowledge emotions (i.e., surprise, interest, or confusion) mixed with positive emotions (i.e., happy, content, satisfied). This mixture of positive-knowledge emotions according to Silvia (2012) is simply referred to as pleasant emotions according to Desmet (2002) whereby

individuals can experience such emotions as pleasant surprise, amusement, satisfaction, and fascination.

It is interesting to note that between the two viewings of the dress incorporating lights (i.e., viewing 3 with light-only and viewing 4 with music-lights) that the light-only viewing produced feelings of dislike. Additionally, the order of predominant feeling for the lights-only dress (i.e., intrigue, happy, calm, and weird) was almost reversed for the music-lights dress (i.e., weird, calm, happy). This suggests that feeling mostly strange/weird along with some pleasant feelings may produce an overall better aesthetic experience than experiencing the opposite (i.e., less weird feelings). These weird feelings may possibly be correlated to the amount of novel sensory cues experienced by the participant. For instance, each additional multisensory cue seemed to create more weird feelings for participants.

Another difference between the light-only dress and the music-lights dress was that lights-only participants verbally expressed feeling intrigue mainly. Therefore, there may have been a disfluent processing of the lights-only dress, whereby the participants were cognitively intrigued but could have had a challenging time understanding the stimulus whereby creating some dissonance. However, it should be noted that the presence of emotional intrigue during viewing is not always a negative experience. For instance, the most liked dress-only viewing where participants wanted to see more dresses in museums had promoted feelings of intrigue (i.e., calm, intrigue, and springtime). Therefore, it is possible that the predominate order of emotive processing rather than the presence or absence of an emotion (e.g., intrigue) may be more of a contributing factor towards having a more pleasurable viewing experience.

Since the order of emotions is important to the gestalt aesthetic experience, this result may be best explained by applying Asch's (1946) Impression Formation Theory to the present

study were isolated impressions of a dress's sensory cues can change the gestalt impression of the dress drastically. In particular, Asch's (1946, p. 270) experiment 6 is an ideal example of how the order of words (e.g., in this case emotions) alter impression perceptions, whereby a participant that reads the words in order: "intelligent—industrious—impulsive—critical—stubborn—envious" interprets this to describe a capable person with some minor flaws as compared to "envious—stubborn—critical—impulsive—industrious—intelligent" to describe a person who is problematic with serious challenges. Similarly, the difference between viewing a colored LED lights dress with or without music can produce either esteem or disliking using descriptive emotive words (e.g., weird). Therefore, designers should take note how the addition of multisensory cues impacts viewer's perceptions.

Gestalt Impression

In conclusion, the gestalt impression of the dress during viewing 4 (music-lights) was considered the most aesthetically pleasing overall according to viewers' combination of sensation, knowledge, and emotion. This suggests that stimulating cognitive inquiry is important during the aesthetic processing of artwork, which is something that Duchamp (TATE, 2018) understood as a major influencer of how artwork is cognitively evaluated presently. Furthermore, Leder et al. (2004) also acknowledged the importance of processing artworks cognitively through the formation of the Information Processing Model.

Regarding overall gestalt impressions, it is important to discuss that participants during viewing 4 (music-lights) also had a pleasurable sensory and emotional aesthetic experiences that contributed to the overall experience of the dress being pleasing along with promoting heightened knowledge states. Therefore, stimulating viewer's cognitive interests with both music

as well as lights can promote a stimulating knowledge experience, along with pleasurable emotions and sensations.

Additionally, it is important to note that during beholder gazing, the overall eye-sweeping motions during the music-only dress viewing supports that participants have the most sensory enjoyment of an artwork object in its entirety as a whole rather than merely for its individual parts such as the belt solely. Thus, the gestalt overall impression of the dress (i.e., the sum or totality of its parts) provides a more enhanced sensory experience for the viewer compared to focusing primarily on one isolated area of the dress such as the belt (Berlyne, 1971).

Grounded Theory Model

Since the I-SKE model alone did not afford an accurate means to measure whether and to what extent sensation, knowledge, and emotion were heightened to optimal levels, the present research looked to two additional theories to help address issues with the I-SKE model to fill in a gap. The two theories used to help address this gap were Berlyne's (1971) Wundt cure for pleasure-arousal indication used during the initial formation of the present study, and OSL (Raju, 1980) used to explain results after analysis occurred. As such, the following modified SKE-I theoretical model is suggested with theoretical hypothesis to be tested for future research in determining beholder's aesthetic experiences from stimulation of multi-sensory cues to determine whether a garment is considered aesthetically pleasing in the categories of fashion, art, and costume.

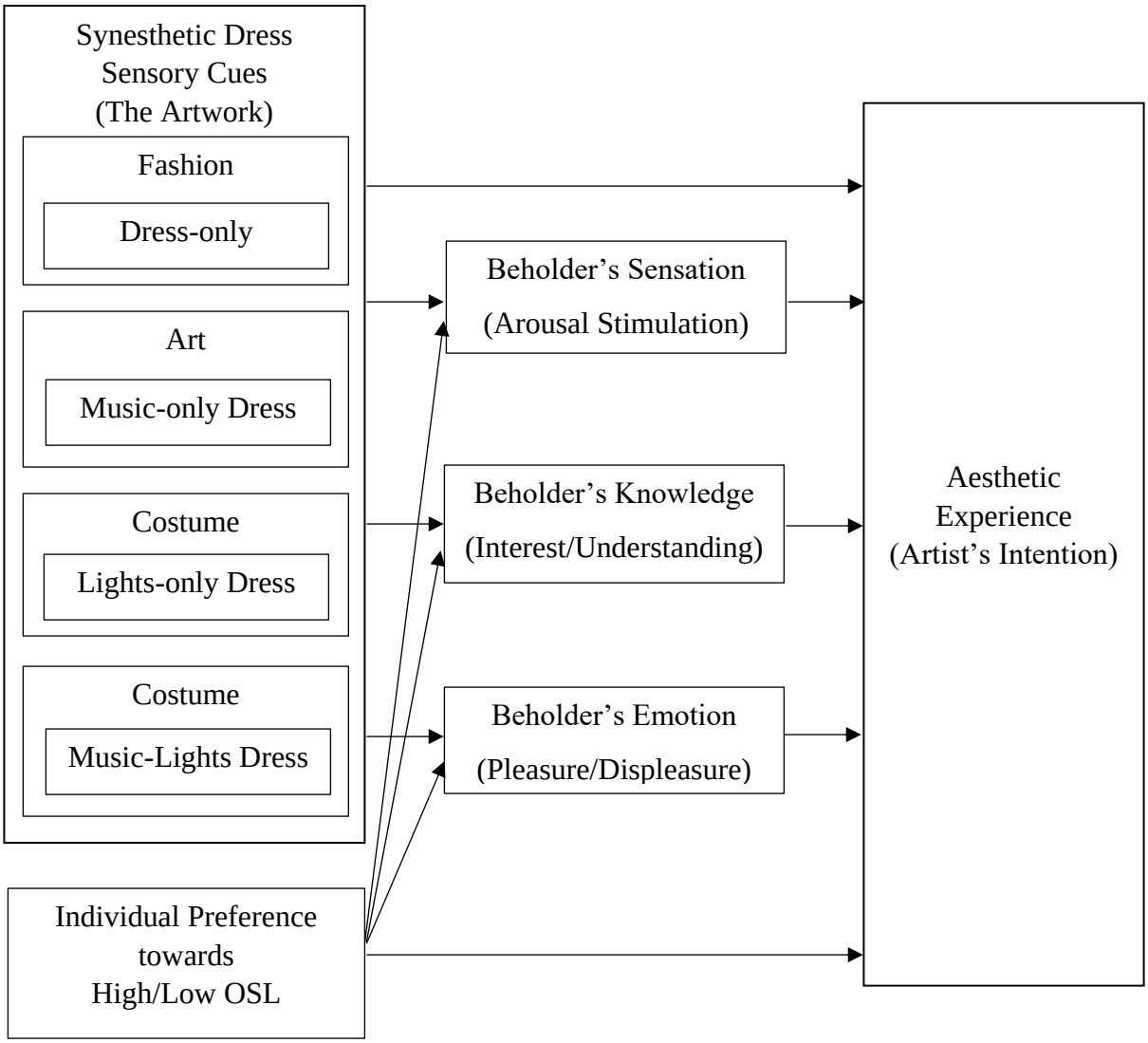

Figure 14. Grounded Theory Model. Suggested model (modified SKE-I model) formulated from present study's grounded-theory approach data analysis and based upon Shimamura's (2013) I-SKE Model.

Theoretical Hypothesis 1: The more sensory cues in a synesthetic dress, the more pleasurable aesthetic experience for high OSL individuals.

Theoretical Hypothesis 2: The more sensory cues in a synesthetic dress, the less pleasurable aesthetic experience for low OSL individuals.

Theoretical Hypothesis 3: The fewer sensory cues in a synesthetic dress, the more pleasurable aesthetic experience for low OSL individuals.

Theoretical Hypothesis 4: The fewer sensory cues in a synesthetic dress, the less pleasurable aesthetic experience for high OSL individuals.

CHAPTER 6. IMPLICATIONS AND CONCLUSIONS

Theoretical Implications

The findings from this research contribute to aesthetic theory, museum research, and present knowledge of technology-enabled apparel. In particular, this study addresses a gap in neuro-aesthetics research. For instance, this research extends the I-SKE model (Shimamura, 2013) and physiological measures into the fields of apparel, aesthetics research, and museum studies. The findings of this study also support the use of Berlyne's (1971) Wundt curve in conjunction with the I-SKE model (Shimamura, 2013) to determine optimal (moderate) states of arousal through beholder's sensation, knowledge, and emotion for a synesthetic dress. This research shows the importance of examining the beholder's sensation, knowledge, and emotion to determine how technology-enabled dresses as artworks are aesthetically processed for a profound aesthetic experience. The beholder's knowledge to be interested in the artwork was found to be an especially important contributor to participants' profound aesthetic experiences of the dress. Therefore, this study supports the importance of appealing to viewer cognition and interest in material objects for pleasurable viewing.

Since the I-SKE model (Shimamura, 2013) is a relatively new model with limited research, this study extends uses for this model into apparel research specifically to examine apparel as an artistic object for aesthetic evaluation. In addition, there has been limited apparel research conducted that uses physiological measurement devices such as wrist skin sensors and eye-tracking glasses. In particular, Berlyne's (1971) Wundt curve was used to inform on EDA data in this study. As such, this study supports the use of physiological measures in conjunction with Berlyne's (1971) Wundt curve. In summary, this research emphasizes the importance of understanding the aesthetic experience using appropriate theories and measures. Additionally,

this study offers a proposed emergent inductive theory combining the a priori I-SKE model with the OSL Theory (Shimamura, 2013; Fiore et al. 2001).

Managerial Implications

The present research may be applicable for designers and manufactures in the textile and apparel industry. In addition, this research has implications for over-stimulated disabled individuals, performing artists, and museum curators. The results of this study may provide valuable insight to designers of technology-enable apparel. For instance, designers may want to reconsider the use of LED lights alone since the lights-only dress was considered too demanding, lower EDA arousal responses, and individuals were less likely to want to see more garments like these in museums. However, paired with music, colored LED lights were more favorably received since individuals were more impressed by apparel with lights and music. Furthermore, music with colored LED lights in apparel caused individuals' EDA arousal response to increase whereby they also experienced more interest in the garment. Therefore, designers and performing artists should consider infusing music in garments that utilize colored LED lights.

Apparel that only has music was considered overwhelmingly liked with the most graceful flow but was the least impressive. Finally, apparel that did not have music or colored LED lights was considered the least exciting, but individuals wanted to see these most in museums. Therefore, museum curators should consider displaying apparel that has no additional sensory cues such as music and colored LED lights.

Limitations and Recommendations for Future Research

This research had certain limitations due to the stimuli itself. For instance, the results of this study are specific to the dress created for this research and are not generalizable. This research merely provides some key information that should be further explored in future

research. Due to the dress for this study being a specific design, with certain colors, made out of a particular material, participants may or may not have different responses to another dress design. Similarly, the music for the dress was subtle and instrumental, which creates a particular mood. If another genre of music was played, the responses to the dress may vary. Thus, it is suggested that future research should explore different dress styles, colors, and materials along with different genres of music.

In addition, this study focused only on millennials. Therefore, other generational cohorts may vary in their responses to a similar study. Sample characteristics such as gender, race, and education were not evenly distributed. Therefore, the results of this study are based primarily on Caucasian women who possess a college degree. Furthermore, there is an uneven distribution of self-reported novice art expertise as well as only a few synesthetes. Therefore, it is suggested that future research examine other generational cohorts with a more diverse sample. In particular, it would be interesting for synesthetes and art experts to be the predominate sample for future studies in determining which sensory cues provide an optimal aesthetic experience in viewing technology-enabled apparel. Finally, EDA data was unreportable for a few participants during viewing 1 (dress-only) and 2 (music-only) due to the wrist skin sensors not reading participants skin conductance. For future research, it is suggested that heart rate be measured, which was unable to be collected for the present study.

Since this research was exploratory in nature to investigate a particular phenomenon, it is suggested that further data be collected and this phenomenon be tested using an experimental design. Future research is also recommended that initially incorporates OSL.

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Appendix A

Museum of Design
Atlanta 1315 Peachtree
Street NE Atlanta, GA
30309

lflusche@museumofdesi
gn.org 404.979.6457

March 25, 2018

To Whom it May Concern:

Virginia Rolling is granted permission to conduct research at the Museum of Design Atlanta for her dissertation project, titled Aesthetic Resonance of a Synesthetic Dress.

Please do not hesitate to contact me if you have concerns or questions.

Laura
Flusche,
Ph.D.
Executive
Director

MODA

museumofdesign.org

Appendix B

Dear Ms. Rolling,

Your protocol entitled "Aesthetic Resonance of a Synesthetic Dress" has been approved by the IRB as "Exempt" under federal regulation 45 CFR 46.101(b)(2).

Official notice:
This e-mail serves as official notice that your protocol has been approved. A formal approval letter will not be sent unless you notify us that you need one. By accepting this approval, you also accept your responsibilities associated with this approval. Details of your responsibilities are attached. Please print and retain.

Consent document/Information Letter:
Attached is a scan of your new, stamped consent or information letter. You must provide a copy for each participant to keep. Also attached is a scan of your approved protocol.

When you have completed all research activities, have no plans to collect additional data and have destroyed all identifiable information as approved by the IRB, please notify this office via e-mail. A final report is no longer required for Exempt protocols.

If you have any questions, please let us know.

Best wishes for success with your research!

IRB Admin
Office of Research Compliance
115 Ramsay Hall
Auburn University, AL 36849
334-844-5966

Dear Ms. Rolling,

Your request for modification of your protocol entitled "Aesthetic Resonance of a Synesthetic Dress " has been approved. The review category continues as "Exempt" under federal regulation 45 CFR 46.110.

Attached is a copy of your approved request.

Official notice:

This e-mail serves as official notice that your protocol has been modified. A formal approval letter will not be sent unless you notify us that you need one. By accepting this approval, you also acknowledge your responsibilities associated with this approval. Details of your responsibilities are attached. Please print and retain.

Consent document:

Attached is a scan of your new, stamped consents. Provide a copy for each participant to keep.

If you have any questions or concerns, please let us know.

Regards,

IRB Admin

Office of Research Compliance

115 Ramsay Hall

Auburn University, AL 36849

334-844-5966

Dear Ms. Rolling,

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Regards,

IRB Admin
Office of Research Compliance
115 Ramsay Hall
Auburn University, AL 36849
334-844-5966

Appendix C

Research Recruitment:

Aesthetics of a Wearable Technology Garment

Purpose:

The purpose of this study is to explore how you feel about a wearable technology dress. This project is approximately 30 minutes of your total time in the format of looking at a dress using eye-tracking glasses and a skin-sensor along with a short interview.

Participating criteria:

-19 to 37 years of age

- No vision problems

-No hearing problems

Questions:

You are welcome to participate by coming back to the recruitment table to pick up a consent form.

Appendix D

The Auburn University Institutional Review Board has approved this Document for use from 05/30/2018 to --- Protocol # 18-148 EX 1804

AUBURN UNIVERSITY
COLLEGE OF HUMAN SCIENCES

(NOTE: DO NOT SIGN THIS DOCUMENT UNLESS AN IRB APPROVAL STAMP WITH CURRENT DATES HAS BEEN APPLIED TO THIS DOCUMENT.)

INFORMED CONSENT
for a Research Study entitled
Aesthetic Experience of a Synesthetic Dress

You are invited to participate in a research study to explore responses to an artwork. This study is being conducted by Virginia Rolling under the direction of Dr. Karla Teel, Associate Professor in the Auburn University Department of Consumer and Design Sciences. You were selected as a possible participant due to your interest in visiting Museum of Design Atlanta and you being between the ages of 19 and 37.

What will be involved if you participate? Your participation is completely voluntary. If you decide to participate in this study, you will be asked to observe an artwork while wearing eye tracking glasses (which are eye glasses to track eye movement) and wrist skin sensors (similar to wearing a Fitbit) to take heartrate along with moisture measurement as well as completing a short interview. Your total time commitment will be approximately 30 minutes.

Are there any risks or discomforts? We know of no risks in participating in this study. There are no risks or discomforts in wearing the eye tracking glasses and skin sensors since these are similar to wearing regular glasses and a wrist watch. You can withdraw from this study at any time.

Are there any benefits to yourself or others? As a participant, you will have the benefit to experience seeing a one-of-a-kind garment and to contribute to the advancement of wearable technology research.

Will you receive compensation for participating? There are no monetary awards for participating in this research.

Are there any costs? There are no costs if you decide to participate in this study.

If you change your mind about participating, you can withdraw at any time during the study. If you choose to withdraw, your data can be withdrawn as long as it is identifiable. Your participation is completely voluntary.

Your privacy will be protected. All data collected as part of this study will be completely anonymous. We will protect your privacy by not collecting any personally identifiable information from you that is attached to your responses. The data in this study may be used in a dissertation publication as well as an academic journal and/or a presentation at a professional conference.

If you have questions about this study, *please ask them now or at any time during your participation.* You can also contact Virginia Rolling, M.F.A. at ver0005@auburn.edu, 678-283-4760 or Dr. Karla Teel at kteel@auburn.edu, 334-844-1345 with questions. If you have questions about your rights as a research participant, you may contact the Auburn University Office of Research Compliance or the Institutional Review Board by phone (334)-844-5966 or email at IRBadmin@auburn.edu or IRBChair@auburn.edu. A copy of this document will be given to you to keep.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO PARTICIPATE.

Participant's signature	**Date**	**Investigator obtaining consent**	**Date**
Printed Name		**Printed Name**	

The Auburn University Institutional Review Board has approved this Document for use from 05/30/2018 to ---
Protocol # 18-148 EX 1804

The Auburn University Institutional Review Board has approved this Document for use from 5/30/2018 to ---. Protocol # 18-148 EX 1804.

Appendix E

Pre-Study Survey Questions

Participant #_____

Thank you for your participation and consent. Please fill out the form below to ensure you are eligible to participate in this study.

1. Are you between the **ages of 19 and 37** years of age? **YES or NO** (Circle One)

2. Are you a **current museum member**? **YES or NO** (Circle One)

2. How would you describe your **level of art expertise**? **SKILLED, INTERMEDIATE, or BEGINNER** (Circle One)

3. Do you have any **problems seeing**? Please explain if yes. **YES or NO** (Circle One)

3a. Do you wear glasses? **YES or NO** (Circle One)

4. Do you have any **problems hearing**? Please explain if yes. **YES or NO** (Circle One)

5. Do you normally experience **seeing colors when hearing music**? **YES or NO** (Circle One)

6. Do you normally experience **hearing music when seeing colors**? **YES or NO** (Circle One)

7. Are you male or female? **MALE or FEMALE** (Circle One)

8. What is your **age**? _____years of age

9. What is your **ethnicity**? **WHITE, BLACK, HISPANIC, ASIAN, or OTHER** (Circle One)

10. What is your **highest level of education**? **NO HIGH SCHOOL, SOME HIGH SCHOOL, HIGH SCHOOL DIPLOMA, SOME COLLEGE, or COLLEGE DEGREE** (Circle One)

11. What is your **annual income level**? _____**LESS THAN $25,000 PER YEAR,** _____**$25,000 TO $49,999, OR** _____**$50,000 AND ABOVE PER YEAR** (Check One)

Appendix F

Aesthetic Response
Main Study Interview Script

Participant #_____

Research Interview Script:
This interview will be comprised of approximately 13 questions in an approximately 15-minute timeframe. Before we get started, do you have any questions for me?

1. What was your first reaction to the dress?
2. What was the most important part of the dress? Please explain.
3. Was there a graceful flow to the dress? Please explain.
4. Where did your eyes focus longest on the dress as you looked? Why?
5. What do you think is the story behind the dress?
6. What did the dress remind you of?
7. What does the dress tell you about art itself?
8. Did you find the dress interesting? Why?
9. How did this dress make you feel? Please explain.
10. Did you like the dress or not? Why?
11. Was this dress exciting or not? Please explain.
12. Did this dress impress you? Please explain.
13. Would you like to see more clothing like this in museums?

Additionally, do you have any further comments you would like to add that we did cover earlier? Thank you for your time and contribution to this study.

*At any point in the interview, the researcher may ask the participant if they would like to view the video recording to help them answer the questions. For instance, “You were looking at this area for a long time, what were you thinking or feeling?”