

Is Wall Color Significant to Museum Visitors?

Exploring the Impact Wall Color in an Exhibit has on the Visitor Experience

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Abstract

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Grounded in the literature of atmospherics, environmental psychology, and color psychology, this study explored if wall color within an exhibition impacts the museum visitor's experience. A quasi-experimental study was conducted with two conditions - treatment, which involved a bright yellow wall in the exhibition, and control, which involved all white walls in the exhibition. There were no differences between the two groups in terms of the time they spent in the exhibition, or their self-described emotions and comfort levels in the exhibition. The one main difference between the groups was that treatment visitors perceived the exhibition to be brighter and more colorful. Museology professionals should next decide whether or not this lack of awareness from visitors is advantageous. These findings have implications for a variety of museology professionals including curators and exhibit designers. Professionals outside the museum field, like interior designers, paint experts, and color theorists, may also benefit from this study.

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Chapter One: Introduction

On May 26th, 2016 *Edgar Degas: A Strange New Beauty* opened in the Museum of Modern Art (MoMA) as their headlining exhibition (Miller, 2016). The exhibit was undoubtedly carefully planned from the number of art pieces to the selection of the artwork itself. What museum visitors may not know, however, is that the color of the wall behind the artwork was shown just as much, if not more, planning and attention. In fact, the dark gray which colored the walls of *Edgar Degas: A Strange New Beauty*, called *Worsted*, was the result of one paint company, Farrow & Ball, spending months experimenting with colors, mixing hues, and deliberating palettes. MoMA commissioned Farrow & Ball to create the brand new color from scratch in order to bring out the charcoals in Edgar Degas' monotypes and sketches showcased in the exhibition. Other museums including The Metropolitan Museum of Art in New York, Museum of Fine Arts Ghent in Belgium, Manchester Art Gallery in the United Kingdom, and the Musee de Rodin in Paris have all contracted Farrow & Ball to select and provide specialty paints for the walls of their exhibitions (Farrow & Ball, 2016).

"People go to museums to see exhibitions", in fact "exhibitions seems to be as much what museums are about as plays are what theatres are about" (Lord & Lord, 2002, p.12). As a central experience for museums, museums commit a lot of time, money, and energy into exhibitions. There are several design factors to consider when producing an exhibition, color being one of them. As evidenced by the number of top museums contracting Farrow & Ball, wall color is not a secondary thought when designing an exhibit - but could the same be said for museum visitors when experiencing an exhibition?

According to Kotler (1974) *atmospherics* is defined as “the conscious designing of space to create certain effects in buyers” (p.50). Subsequently, there is a vast body of literature regarding atmospherics in the business, retail, and marketing sectors which use environmental psychology to look at consumer predictions and buyer response (Turley & Milliman, 2000). The idea of atmospherics has grown and is now commonly used as “an umbrella term for the overall design and ambience of a retail, leisure, or service environment” (Forrest, 2012, p.30). This includes museums. There have been studies exploring the effects atmospheric properties have on museum visitors including layout, music, color, light, and aroma but little has been done specifically on color as an independent variable (Turley & Milliman, 2000). Since “studies have shown that colour affects us psychologically,” it could be assumed it would inside an exhibition as well (Maximea, 2002, p.171). In fact, color has been proven to affect engagement levels, walking pace, and buyer response in retail environments (Tullman, 2000; Hall and Hanna, 2004; Yüksel, 2009).

As such, the purpose of this study is to explore whether or not the color of a wall within an exhibition impacts the museum visitor’s experience, and if so, how and to what degree. This study explored four research questions specifically:

- 1) How does wall color affect visitors’ stay time in an exhibition?
- 2) How does wall color affect visitors’ emotions in an exhibition?
- 3) How does wall color affect visitors’ comfort in an exhibition?
- 4) How does wall color affect visitors’ perceptions of the artwork on the wall?

Knowing how wall color affects visitors benefits museums in deciding how much time and money (if at all) they should spend on the background color or wall color for exhibitions. Curators, preparators, and exhibit designers within museums will benefit more from this study

than other museum professions. Organizations outside the museum field may also benefit from this study including interior design firms and paint corporations. In fact, anyone interested in environmental psychology or atmospherics would see value in this study including psychology academics and artists.

Chapter Two: Literature Review

“Exhibitions are at best magic, and at worst dreary trudges around gloomy trade shows or museums” (Velarde, 2001, p.xvii). The purpose of this research study was to explore whether or not the color of a wall within an exhibition affects museum visitors’ experience and if so, how and to what degree. Is color a tool to help develop “magical” exhibitions? Or is it simply a distraction from the exhibition’s content or message? This research study is situated within three main bodies of literature - atmospherics, environmental psychology, and color psychology. The following chapter positions this research study in the context of these bodies of this literature to identify what is known and what is not known about this research topic.

Atmospherics

Atmospherics is the main body of literature this research study is grounded in, as it is not only increasingly relevant for museums today, but also encompasses the other two literature bodies of environmental psychology and color psychology. Philip Kotler was the first to use and define the term in 1974 (Turley & Milliman, 2000). Kotler is therefore credited for coining the term *atmospherics* “as the conscious designing of space to create certain effects in buyers” (Kotler, 1974, p.50). Atmospherics did not start out in the museum field, but rather the marketing and business world. Researchers like Cox (1964), Smith and Curnow (1966), and Kotzan and Evanson (1966) have all examined atmospheric effects on consumer behavior. Kotler and the many before him believed that consumers react to more than just the product they are buying, but to everything the product encompasses, including the place in which the product is located. Kotler predicted that the place, spatial aesthetics, or atmosphere surrounding a product would one day be

a highly regarded marketing tool the business industry would consciously and skillfully use to their advantage, just as other marketing tools like public relations and advertising are used.

Today, atmospherics is used just as Kotler predicted and even more. It is a relatively new field, however, and organizations are still having difficulty practicing this theory. Managers are changing their “organization’s physical surrounding in an attempt to control its influence on patrons, without really knowing the impact of a specific design or atmospheric change on its users” (Bitner, 1992, p.57). The field is growing in part thanks to sister fields like environmental psychology and is becoming widely used successfully in the business industry, including general marketing and retail environments (Turley & Milliman, 2000).

In marketing, atmospherics helps promote products, influence buyer response, and forecast buying trends by utilizing the aesthetic variables surrounding products. Atmospherics covers everything and anything sensory. This includes visual, aural, olfactory, and tactile dimensions (Kotler, 1974). Turley & Milliman (2000) list over 57 atmospheric variables that may influence patrons. From the size of the building, to flooring and carpeting, to the placement of products on shelves, there are numerous environmental factors atmospherics can encompass. Color, and more specifically interior color, is simply one of them.

Atmospherics, as a whole, can affect people in a variety of different ways that usually fit into two categories coined by environmental psychologists: approach and avoidance (Mehrabian and Russell 1974). Approach behaviors are positive in manner and may include the desire to stay, explore, spend money, or browse in a particular environment (Bonn, Joseph-Mathews, Dal, Hayes, Steve, & Cave, 2007). Avoidance behaviors, on the opposite side, are negative in manner and may

include the desire not to stay, explore, or affiliate with a particular environment (Bonn et al., 2007).

According to Kotler (1974), atmospherics affects customers in their purchase behavior with the direct attention or messages it provides the product. The amount of time people devote is also affected by atmospherics (Donovan, Rossiter, Marcoolyn, & Nesdale, 1994). Unsurprisingly, people tend to spend more time in environments they find pleasant. The question, however, is what is pleasant and what is not. The field of atmospherics aims to examine just that.

A significant amount of the research deals with shelf space - either the placement of products or the grouping of products - as well as the signage shelves host (Turley & Milliman, 2000). The most studied interior variable in atmospherics is music. Researchers like Smith and Curnow (1966), Milliman (1982), Andrus (1986), Yalch and Spangenberg (1988), Areni and Kim (1993), and Herrington, Duncan, and Capella (1996) have found that music in store environments significantly impacts sale behavior, arousal, perceptions of time as well as actual time spent, and traffic flow in consumers (Turley & Milliman, 2000). Along with interior variables, studies have also been conducted on the exterior factors like storefront, window displays, and architecture.

Color in Atmospherics

Research in marketing shows that it only takes 90 seconds for people to form an impression after their initial interaction with a product and “62-90 percent of the assessment is based on colors alone” (Singh, 2006, p.783). In atmospherics, research has focused on the color of the product itself as well as background color and subsidiary colors. It has explored exterior colors as well as interior colors. Yüksel (2009) found the exterior color of a store can affect the perception of the merchandise and environment inside. Through a study comparing an orange

exterior versus a blue exterior, he found that “a blue-colored exterior led to significantly lower crowding perception than the orange-colored exterior” (p.233). With online formats, studies found that the background color of a website affects visitor’s perception of the webpage’s downloading speed (Gorn et al., 2004) as well as their intentions to purchase (Hall and Hanna, 2004).

A noteworthy study, particularly relevant to this research because of its comparative nature, is Tullman’s (2000) study conducted with two different merchandise displays in front of a store, one with a colored background which illuminated and changed colors and the other non-colored. Tullman discovered that customers spent an average of 24 seconds more in front of the display with a colored background than in front of the control display that was not colored. On average, customers stopped and looked at the colored display for 46 seconds, whereas the control display only received an average of 22 seconds of viewing time from visiting customers. Not only did the colored display attract and hold customers’ attention longer, it also influenced more customers to interact with it. An average of 34% of people who stopped also engaged with the colored display as opposed to only 12% for the control display. This research study, among the others, helps us understand that the color of a display can influence people’s perception, time spent, and engagement levels.

Although there has been numerous studies on atmospherics dealing with color, there is still a need for further study in the field. A significant amount of the research has taken place “in a simulated environment by using laboratory designs” (Turley & Milliman, 2000, p.207). The field could benefit from studies conducted in real-time environments as opposed to a lab-settings. It would also benefit from a study focusing on the single variable of interior, background color, as

opposed to product color, subsidiary colors, or a mixture of several atmospheric elements like color and light .

Atmospherics in Museums

Much of the literature on atmospherics is grounded in the retail or public sector, although a small portion has been applied to *servicescapes*. Tourism and interior design firms have utilized atmospherics for their servicescapes like hotel lobbies, dentist offices, banks, hospitals, restaurants, and even museums. These studies have found that atmospherics in servicescape environments are vital because patrons receive their “service” simultaneously in the same location (Bitner, 1992). This means the physical environment is reflective of the service because the service is received inside the environment.

Studies conducted in hotel lobbies have found that patron loyalty is directly related to their satisfaction of the lobby interior (Khanau, 2015) and that atmospheric variables such as color, lighting, and style greatly contribute to the overall impression of the hotel lobby (Countryman & Jang, 2006). In fact, color was found to be “the most significant of the three atmospheric elements” in the latter study (p.534). Studies have also concluded that along with psychological effects, “the perceived servicescape may also affect people in purely physiological ways” (Bitner, 1992, p.64). In general, physical effects include headaches from loud music, vertigo from bright lighting or nausea from scents, and shivering or perspiration from the temperature held in the environment. Overall, atmospherics research has linked psychological and physiological effects in patrons visiting servicescapes.

Recently, atmospherics has been applied to museums and their exhibitions. Research has found specific components in museum environments influence visitors’ overall visit experience

satisfaction and revisit intentions more than others (Kottasz, 2006). According to Baker (1987), Foxall (1997), and Turley and Milliman (2000), atmospheric elements can be categorized into five groups: exterior, interior, layout and design, decoration, and human factors. Kottasz (2006) found that interior atmospheric elements which include lighting, color, temperature, scent, and sound as well as decoration atmospheric elements which include signage and displays, were found to impact museum visitors more than exterior atmospheric elements, layout and design, and human or social factors. A study focusing on interior atmospheric elements found color scheme, lighting, and signage to specifically impact visitors' intentions to return for a second time and even increase the chances of them recommending the museum to another individual (Bonn et al., 2007). This aligns with research conducted more broadly in the tourism field which has found a direct correlation between physical renovations (whether interior or exterior) and higher visitation (Barbieri, 2004; Sirefman, 1999).

Generally, studies involving atmospherics encompass several environmental variables rather than focusing on one specific element, like color. Forrest (2014) has conducted several research studies examining atmospheric elements in museum exhibitions. Her doctoral dissertation, titled "Design Factors in the Museum Visitor Experience" for the University of Queensland in Australia produced a research tool called the Perceived Atmosphere Instrument which measures the relationships between exhibition environments and museum visitor experiences through a series of likert scales.

The purpose of Forrest's research was to better understand the role that an exhibition environment plays in the museum visitor experience. The study was conducted in four exhibitions at the South Australian Museum, a natural and cultural history museum located in Adelaide,

Australia. A total of 602 museum visitors participated in the study by completing the Perceived Atmosphere Instrument focusing on the atmospheric elements of lighting, color, structure, and space. A small sample of those participants were also unobtrusively tracked through the exhibition environments.

Forrest found that vibrancy (which includes the atmospheric element of color) was the greatest factor in exhibitions that affects cognitive behavior in museum visitors, specifically how much time visitors spent inside the galleries and how intrigued they were. In fact, “engagement is more likely in exhibits that are perceived to be more vibrant” by museum visitors (p.209). Vibrancy also contributed the most towards visitors’ feeling their time was both “worthwhile” and “enjoyable” while in the exhibition environment (p.155). Spatiality, however, contributed the most towards visitors’ feeling relaxed in the exhibition. Overall, the aesthetic variables of lighting and color in exhibitions coupled with having exhibitions open and uncluttered help visitors have a positive experience in museums (Forrest, 2014).

Another study of atmospherics in museums, conducted by Mark A. Bonn, Sacha M. Joseph-Mathews, Mo Dal, Steve Hayes, and Jenny Cave (2007), found similar results. Their research focused on three main areas: whether certain atmospheric elements impacted visitors’ attitude, intention to revisit, and intention of sharing their experience with others. The study was conducted at four different heritage sites in Tampa, Florida: the Museum of Science and Industry, Florida Aquarium, Tampa Bay Performing Arts Center, and Lowry Park Zoo. A total of 500 museum visitors across the four sites were interviewed regarding “their intention to revisit, their overall impression of the attraction, on-site expenditures, intention to recommend the attraction to others (i.e., word-of-mouth intentions), service quality perceptions, service environment

perceptions, and overall image of the attraction” (p.349). Bonn et al. found that ambiance factors (which they defined as the atmospheric variables of color scheme, lighting, and signage) had the strongest impact on whether or not visitors intend to revisit the heritage site and share their experience with others after they leave. Design and layout had the strongest impact on overall attitude towards the heritage site. According to Bonn et al., design and layout includes atmospheric elements like the ease of movement within the site’s interior spaces including the location and placement of displays.

Although the research conducted by Forrest and Bonn et al. suggest color has a large and positive impact on museum visitors, their studies also grouped color together with several other atmospheric elements. Because of this, it is impossible to know whether or not color directly influenced the visitors or if another atmospheric element did, or the combination of all the variables together did. The only way to know for certain is to conduct a study which isolates the atmospheric elements from each other and focus on one variable, like color, for the entire study.

Environmental Psychology

Environmental psychology is “the study of transactions between individuals and their physical settings” (Gifford, 2007, p.1). Although environmental psychology looks at both the impact environment has on humans and the impact humans have on the environment, only literature focusing on the foremost concept is discussed for the purpose of this chapter. In fact, since the early 1900’s scientists have been studying the effects environments have on human behavior. It was not until the late 1960’s, however, that psychologists started researching people’s reactions to an entire physical surrounding as opposed to only their personal space or

microenvironments (Stokols, 1995). The difference would be an entire room in a public setting as opposed to your bedroom or the few feet around you.

Overall, environmental psychology suggests environmental factors play an important role in our lives and can influence our behavior and emotions. Environmental factors can be anything from the shape of the room, to the temperature inside the room, to the type of lighting and colors used. The wide range of physical factors that could play into someone's perception of an environment are countless and diverse. According to Mehrabian and Russell (1974), most research conducted in the environmental psychology field has focused on the environmental variables of sound, temperature, texture, and color. Although some studies have been conducted on the impact of color in environments, there is an overwhelming amount of support for further research on the topic. In fact, Mehrabian and Russell (1974) claim the same popular variables also "provide a useful base for further study" (p.7). Cassidy (1997) claims there are common beliefs in our culture about certain colors but "the way in which different colours in the environment impinge on behaviour and experience has not been widely researched" (p.82). Perhaps there is still a need to research color in an environmental setting because of the lack of consistency past studies have produced.

Color can be stereotyped. There is "a popular belief that bright colours are cheerful and pastels are relaxing" and that warm colors like red and orange increase aggression or agitation (Cassidy, 1997, p.82). These stereotypes, however, do not always stay true when applied to an environmental study. For example, *Time Magazine* reported a significant increase in IQ scores when subjects were tested inside bright rooms either colored blue, orange, or yellow as compared to individuals who were tested inside rooms colored neutrally with one of the hues white, brown,

or black (Blue, 1973). However, a different study found no difference in math or reading performance when subjects were inside differently colored rooms (Ponte, 1981).

Another study conducted by Seidler (1995) found no difference in physical performance when volunteers ran on treadmills in rooms boasting white, red, or blue environments. Furthermore, during the study, Seidler asked a series of emotional questions to the participants and found that “80% reported feeling more negative in the red environment” while running (p. 226). Alternatively, a different study found the color red to be more stimulating than green or white (Kwallek & Lewis, 1990). In three different environments, researchers measured students’ ability to conduct a proofreading assignment. The most successful environment was the room colored red, with students producing the least amount of errors, suggesting they were more focused while being tested than the others.

There might be two explanations for this inconsistency in environmental psychology research findings relating to color: one, there are more than physical factors playing into one’s perception of the environment; and two, there are more than the characteristics of a hue influencing one’s perception of the color. Both explanations account for personal and cultural influences. In terms of environmental variables, a person can be influenced culturally and personally (Gifford, 2007). If a person feels negatively towards an environment, it may be because of the dim lighting or unpleasant color of the carpet, but it may also be because of personal reasons or a cultural preference. Perhaps the person is simply having a bad day or they grew up in a well-lit household that never had dim lighting. There can be a plethora of reasons why someone does not like an environment, all of which cannot possibly be accounted for by researchers conducting a study. The same applies for color perception in an environment. Perhaps someone

does not like the color red, because the hue really does evoke anger. Or, they might not like the color simply out of personal taste or from a cultural preference ingrained from childhood. Overall, there are many factors, physical and mental, that play into one's perception of an environment, color simply being one of them.

As with all research fields, there are both contradictory and consistent findings in environmental psychology. One of the most consistent theories is the Baker-Miller Pink Theory. The color Baker-Miller pink has been consistently linked with lower levels of aggression, anxiety, and blood pressure over the years. The link between the color and aggression was first found in the 1980's. Schauss (1985) confirmed Baker-Miller pink helped suppress violent behaviors in juvenile correctional facilities and psychiatric hospitals. In a study with two rooms, one painted with Baker-Miller pink and the other painted red, anxiety levels measured significantly lower when individuals were in the pink room (Profusek & Rainey, 1987). In 1991, several studies focusing on the Baker-Miller pink were conducted. One study found Baker-Miller pink reduced systolic and diastolic blood pressure in emotionally disturbed participants (Gilliam, 1991) and another found that prisoners displayed less abusive and aggressive behavior towards police when residing in cells painted with Baker-Miller pink (Bennet, Hague, & Perkins, 1991).

Throughout the United Kingdom in the 1990's, Baker-Miller pink was used in a variety of settings to decrease aggression including in psychiatric hospitals and police cells (Cassidy, 1997). Today, the theory is even applied in college athletics in the United States. The visiting locker room at Kinnick Stadium for the University of Iowa is entirely pink (Hyland, 2014). The walls, bathroom stalls, toilets, sinks, and even showers are pink. The room was remodeled in the 1980's by the team's new head coach, Hayden Fry, who happened to study psychology at Baylor

University. Fry read about the Baker-Miller Pink Theory and decided he wanted Iowa's opposing teams to feel calm right before games. Although not scientific, Iowa's victory rate for home games could be an indication of more support for this theory.

Environmental Psychology in Museums

Although it goes by a different name, environmental psychology is actively being studied in museums today. "Visitor studies has become the name of the field for those who study the visitor perspective to environmental design issues in museums" (Bitgood, 2002, p.462). Although both fields are similar, visitor studies focuses on three main research areas: audience research, exhibit and program evaluation, and orientation and circulation of visitors inside the museum. So although color is an environmental factor that is a part of a museum, it is not necessarily a primary focus in the visitor studies field. When color is discussed in visitor studies in museums, it usually surfaces through the evaluation of exhibitions or visitor circulation. For example, while evaluating an exhibition, the contrast between an object and its background setting is taken seriously since it allows visitors to easily detect objects and read content better (Bitgood, 2002). Color is often coupled with lighting, line of sight, and other design factors like these because they all contribute to improving a visitor's experience inside a museum.

Circulation within a museum and the study of visitor traffic flow has been a main research topic for visitor studies. One early study conducted by Srivastava and Peel (1968) investigated how color influences foot movements while standing and walking within a museum. The purpose of the study was "to demonstrate that a change in the color of an environment will bring a change in the pattern of human movement within that environment" (p.9).

The study was conducted at the Spooner Thayer Museum of Art at The University of Kansas in an exhibition room hosting Japanese artwork similar in design to the other galleries in the museum. The study was designed with two phases, one with the gallery colored light beige and one with the gallery colored dark brown. Everything in the exhibition stayed the same except for the color change. The study had two participant groups, one group consisted of museum visitors who did not know about the study being conducted and the other group consisted of recruited individuals who were aware of the study. Researchers measured the area (amount of square feet covered), elevation (number of footsteps taken), and time (amount of time spent within the exhibition) of participants who entered the Japanese art exhibition. With these measurements the researchers were able to calculate pace (elevation/time) and density (elevation/area).

The study found that visitors who knew about the study, who knew their movements were being recorded, showed no differences in their movements between the light beige exhibition and the dark brown exhibition. However, visitors who did not know about the study or that their movements were being recorded tended to take more footsteps, cover more area, and spend less time in the dark brown environment than those in the beige environment. Overall visitors moved faster through the dark brown exhibition suggesting that color in a museum setting can affect visitors.

Srivastava's and Peel's (1968) research results align with more recent studies conducted in the general field of color psychology. For example, *The New York Times* recently published an article concerning interior color for schools and found that the colors red, orange, and yellow were often used in hallways to speed children along when passing between classes (White, 2016). This

suggests that color can affect a person's perception, including time estimation (Mahnke, 1996; Bellizzi & Hite, 1992). In general, time is overestimated in environments with warm colors and underestimated in environments with cool colors. If someone believes they have been in a room longer than they have, they tend to speed up their activities and move through the room more quickly. Visa versa, if they believe they have not been in the room long, they will take their time and move at a slower pace. Along with helping understand why participants may have moved faster in the darker exhibition during Srivastava's and Peel's study, color psychology is another noteworthy field which can account for other perceptions and behaviors of visitors in museums.

Color Psychology

"Color, or the concept of color, can be approached from different perspectives and different disciplines" (Mahnke, 1996, p.2). It can be described through art, natural sciences like physics or biology, philosophy, or psychology. For the purpose of this study, color will be discussed primarily through the psychologist's lens with background context given through the physicist's lens. Physiology is inherent when discussing color because color is not the property of objects or surfaces but rather the representation our brain creates from seeing light (Mahnke, 1996). "For the physicist, therefore, color is a wavelength of light that an object either generates or reflects" (Mahnke, 1996, p.7).

Humans, on average, receive 80% of their information from the environment (Mahnke, 1996). Since there is not an environment without color, it is safe to say color provides information and communication to us constantly. There has been an abundant amount of research conducted studying emotional responses to colors. These studies show that different colors evoke different information and can affect us both psychologically as well as physically. An early study,

conducted in 1959, found that bright and highly saturated colors tend to produce more pleasant feelings than colors that are not (Guilford & Smith, 1959). There are also some cultural associations for color that are different across the globe. For example, turquoise is the national color of Persia and is commonly used for protection and guidance (Mahnke, 1996). In Islam, green is a symbol of hope because the cloak of the prophet was thought to be green. In Japan, red is the national color and seen as powerful.

Although differences have been found due to cultural and demographical reasons, like gender and age, collective findings support humans have common reactions to colors. So much, in fact, “it may be said color is a universal language” (Mahnke, 1996 p.54). In general, the color red is seen as exciting and can increase attentiveness or nervousness (Birren, 1965). Orange is usually seen as the same as the color red, although it has a high appetite appeal. Yellow is seen as cheerful. The color “green tends to reduce nervous and muscular tension” as well as increase meditation (Srivastava & Peel, 1968, p.7). Generally, the color blue is a favorite across demographics and is seen as pleasing and restful (Birren, 1965). Purple is royal and deep. The colors white, gray, and black are seen as neutral with white being sterile, gray being passive, and black being negative or ominous.

These stereotypes for colors have been established through research studies which normally involve participants looking at either color chips/samples or looking into colored light. For example, one study conducted by Frieling in 1990 had subjects look into red, yellow, green, or blue light for extended periods of time while tape recording their reactions (Mahnke, 1996). He also recorded physiological reactions, like pulse and blood pressure, and wrote down participants’ observable physical reactions. His study found that red light was arousing and caused subjects’

blood pressure to be sporadic and pulse to increase. Some participants also indicated their throat felt tight. Yellow light was found to be mighty and sunlike, although participants did not necessarily indicate feeling calm or pleasant. Green light was found to be compelling, agreeable, pleasant, and sometimes calming. Blue light, however, was always found to be pleasant and caused subjects to feel restful and calm. Participants never indicated arousing nor unpleasant feelings while gazing into blue light.

A large-scale study researching color associations was conducted by Mahnke (1996) over several years from 1991-1994. Unlike other color association experiments, Mahnke's study did not limit participants from choosing only one color chip for each association. Instead, he allowed participants to assign paints and colored pencils to emotions with the ability to assign more than one color or a variety of shades of the same color to each term. Subjects "were asked to assign colors to the below listed terms without thinking about objects but rather how they associate with the concept or idea of the terms" (p.55). Although the study was conducted several different times throughout the United States, participants came from the United States, Canada, Australia, and Japan, reflecting an international representation. The study consistently found links between emotional terms and colors. For example, 81% of the time, the color red, or the color combination of red and violet, were chosen to represent the term love. For the term hatred, participants associated the colors red and black 89% of the time. The color palette of blue, blue-green, and green was chosen 94% of the time to represent the terms peace and tranquility. For the term sorrow, the ominous colors of black and gray were chosen 86% of the time and for the term happy, the bright colors of yellow and orange were chosen 63% of the time. The color green was chosen 73% of the time to represent the term life.

The same study was then replicated and conducted in Europe for more variance in cultural representation with participants coming from Germany, Austria, and Switzerland (Mahnke, 1996). Although the percentages are lower, the results from the European study align remarkably well with the results from the previous studies conducted in the United States. For example, the color red was still the highest color chosen to represent the term love, although it was chosen 72% of the time compared to 81% in the first study. This study, among many others, strongly suggests that “although cultural differences are evident, we know that many reactions to color are universal and cross cultural boundaries” (Mahnke, 1996 p.17).

Color Psychology in Museums

As stated earlier, most research studying color associations has been designed “utilizing colored lights, or in some cases color samples. Fewer studies have been conducted with the effects of surrounding color - that is colored rooms” (Mahnke, 1996, p.40). Where studies have been conducted in a closed room environment, results are inconsistent.

For example, a famous study conducted by Louis Cheskin in the 1950’s supports that the color used in closed environments matters (Mahnke, 1996). Cheskin decorated four rooms entirely in one color, even furnishings such as typewriters, chairs, desks, and curtains were colored to match the color of the room. Each room was either red, blue, yellow, or green. Hardly any abnormal results were recorded for individuals in the yellow or green rooms, however, two extreme results on the opposite sides of the spectrum were concluded for the other two rooms. In the red room, participants’ blood pressure and pulse increased greatly. Participants even had difficulty working and remaining in the room for long periods at a time. The blue room, however, had the opposite effects on participants. While in the blue room, participants’ blood pressure and

pulse not only declined, but activity rates slowed down and participants were able to stay in the room for extended periods. A different study, almost parallel to Cheskin's, conducted by Fr. Hans Jurgen Scheurle in 1971 found conflicting results (Mahnke, 1996). In Scheurle's study, blood pressure and pulse rates decreased and steadied in both the red and blue rooms alike.

“There are as many ideas about suitable colours for exhibition galleries as there are designers and curators” (Lord & Lord, 2002, p.171). Truly, no color should ever be ruled out when discussing the palette for the next exhibit, but often are due to trends or time constraints. If a gallery changes multiple times a years, it is not cost or time effective to paint the walls for every transition. It is simply easier and cheaper for a museum to keep the walls the same color they have been. Museums often rule out painting gallery walls dramatic colors for the same reason, a neutral wall color tends to align with more exhibitions than a bold color would. They also benefit the exhibit gallery in different ways. The color white reflects light and makes rooms appear larger and more bright than they are. It also absorbs ultraviolet radiation, helping protect museum objects from the harmful light that may be coming in through windows. Perhaps this is why white and other neutral colors are commonly seen in museum galleries: their low values have diverse benefits whereas bold colors do not.

Even though the color white may be the norm, it does not necessarily mean it should be. Slatter and Whitfield (1997) discovered that the function of a room highly impacts whether or not the wall color for it is appropriate while David Dernie (2006) strongly encourages museums to consider the artwork which will be on display in the exhibition before deciding the wall color. “The predominance of the off-white modern gallery interior, for instance, would seem, because of its perceived neutrality, more a matter of convention than necessarily always appropriate”

(Dernie, 2006, p.163). The composition, tone, and feel of the artwork on display should all determine the wall color choice. For example, “a dark work is not necessarily best seen against a light surface” (Dernie, 2006, p.163). Nevertheless, there are multiple factors taken into consideration when determining the wall color for an exhibition including the “relative permanence of a particular installation, the cost of repainting between shows, the need for a contrasting background, and the need for a special work of art or exhibition module to be set apart and given extra prominence” (Lord & Lord, 2002, p.171).

Most museums paint their galleries for each new installation, whether that be touching up nail holes with the current color or completely repainting the entire gallery. Many museums now, however, routinely repaint their exhibit galleries for an upcoming show (Lord & Lord, 2002). Since “the process of designing with color can be quite complex and challenging” curators often find inspiration or consultation from interior designers when choosing the new color for exhibit walls (Portillo, 2009, p.1). Interior Design practices for color follow color psychology findings, but also look at how color affects the environment depending on where in the room it is applied: the walls, ceiling, and floor. The location of color in an “interior space can make a great deal of difference in influencing a room’s character, the way it is perceived psychologically, and subsequent reactions to it” (Mahnke, 1996, p.66). Depending on where the color is within a gallery, it can make rooms appear bigger than they are, increase the height of ceilings, or draw visitors’ attention towards different elements (Grimley & Love, 2007).

How color is perceived on walls can be different than what a color generally evokes within a person. Gillford (2007) explains that “colors have a different impact on us when they appear on isolated chips than when they appear on walls” (p.28). This explains why many people

are disappointed after painting a room with a color they liked when they saw it at the home improvement store. The meaning of a color is different when we see it alone compared to seeing it combined with different elements. Frank Mahnke (1996), a worldwide known environmental designer and color consultant, composed the following list of emotions with colors once painted and seen on wall interiors. He listed red being seen as aggressive or advancing; orange as warm or luminous; yellow as exciting or irritating (depending on the amount of saturation); green as secure, calm, reliable, or passive; blue as cool, encouraging, or space-deeping; purple as subduing; gray as neutral or boring; white as neutral, empty, sterile or without energy; and black as ominous (p.67-70). Although this list can serve as a good guideline for choosing wall color within a museum gallery, it should not be the only factor used when determining the final color.

Summary

Overall, it does not matter what term is used (atmospheric elements, physical characteristics, environmental factors), or from what field it comes from (atmospherics, environmental psychology, color psychology), research has linked color to causing a number of effects in people (whether they be consumers, customers, or visitors). Effects caused by these variables are known to be both psychological and physiological. The main psychological effects are emotions, perception, and perception of and actual time spent. The possible physiological effects range too greatly between the research fields and their studies to summarize unanimously but are generally either physical discomfort or comfort.

Although atmospherics started out in the marketing sector, the field has grown and is used successfully in many different applications, including servicescapes and museums. Environmental psychology has helped the field of atmospherics flourish and continues to thrive on

its own providing many examples on how the physical environment can influence those immersed in it. Color psychology is used in both atmospherics and environmental psychology and generally shows us color perceptions are universal.

Essentially, there are positive relationships between the brightness of a color and a person's pleasure response (Mehrabian & Russell, 1974). But overall, color associations and color perceptions are universal with some differences accounting for personal preferences and cultural backgrounds. Most research in color psychology has been conducted through color association studies dealing with color samples and colored light, although some research has been conducted using the entire space of a closed environment. Color has been a physical variable included in many environmental psychology research studies and most atmospheric research conducted. Although little research has been conducted on the influence of color, as a single variable, inside museum galleries specifically. There also has been research on atmospherics in museum exhibitions, but again, little research has been conducted focusing solely on color and its possible impact on museum visitors. But these gaps indicate a need in the field to examine the possible impact wall color inside an exhibition has on museum visitors.

As with all research fields, the best way to support or argue against a claim is to continue solid research. Studying if and how color influences perceptions will only provide the academic field with more understanding. By understanding how retail and servicescapes have used color as an atmospheric tool, museums can decide whether or not this visitor-approach is worthwhile for their museum setting.

Chapter Three: Methodology

The purpose of this research study was to explore whether or not the color of a wall within an exhibition affects the museum visitor's experience and if so, how and to what degree. This study was guided by four research questions, specifically:

- 1) How does wall color affect visitors' stay time in an exhibition?
- 2) How does wall color affect visitors' emotions in an exhibition?
- 3) How does wall color affect visitors' comfort in an exhibition?
- 4) How does wall color affect visitors' perceptions of the artwork on the wall?

This study was designed as a quasi-experimental study, or comparative study, with two groups including a treatment group (who experienced the exhibition with wall color) and a control group (who experienced the exhibition without wall color). This chapter describes the methodology for this research. This includes descriptions of the research site, data collection protocol, sample, data analysis procedures, and methodological limitations.

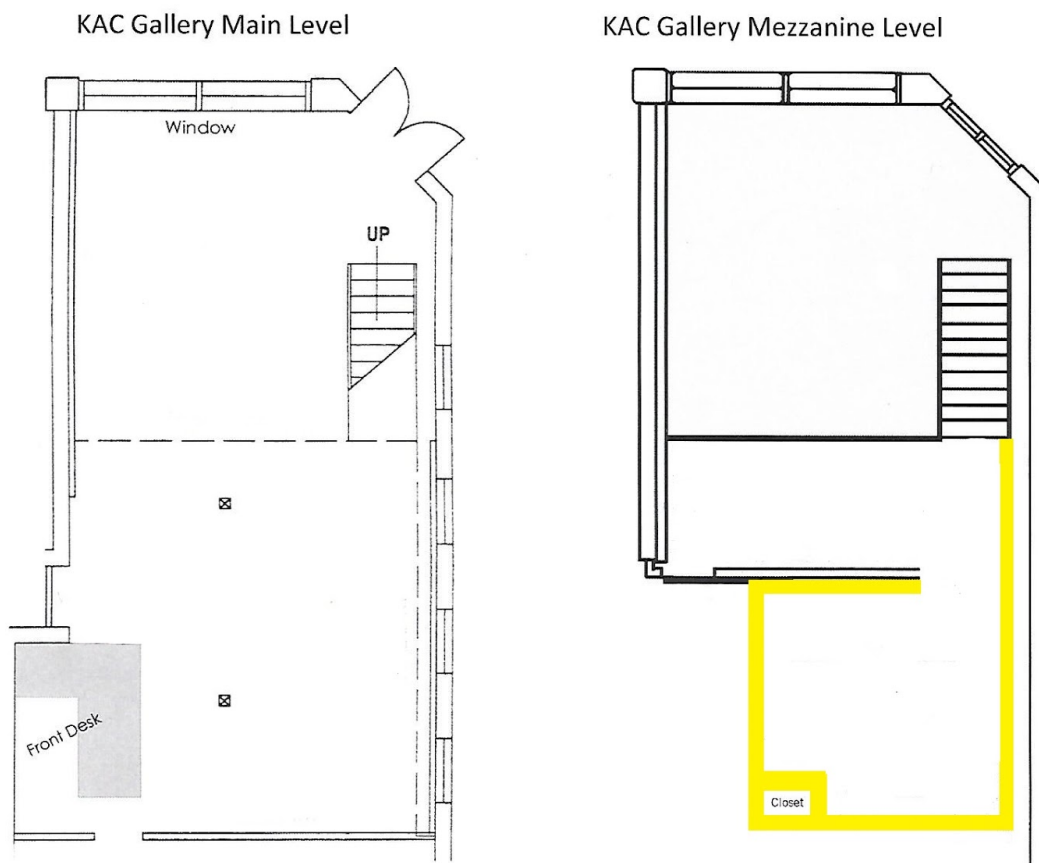
Research Site

In determining the research site, a list of criteria was developed including: having a well-established relationship with the lead researcher and/or the Museology Graduate Program at the University of Washington, as well as having an exhibition running between January - May 2017, which did not specifically address color as a phenomenon and was willing to be modified in design. After a review of potential sites, the Kirkland Art Center (KAC) was approached by the researcher and ultimately agreed to host this study in conjunction with their exhibition *(Dis)Connected*, curated by Kayla Harriel. The exhibition was housed in KAC's two-level gallery and featured artwork mainly from local artists. The exhibition *(Dis)Connected* explored the role of technology in everyday life, specifically in regards to how it can facilitate or hinder

communication and human interaction with artwork ranging in mediums and techniques. A complete list of the artwork, or Exhibition Checklist, can be found in Appendix A for reference.

Instead of incorporating the entire gallery, this study concentrated on a specific area of the exhibition, the enclosed room on the second gallery floor. Photograph 1 below highlights the treatment area on the floorplans of KAC.

Photograph 1: Treatment Area Highlighted on KAC Floorplans



The decision to limit the treatment space, as opposed to using the entire exhibition, was based on several factors. First and foremost, to expedite the transition between research phases, a

smaller area of wall space was quicker to paint than a multi-floored gallery. Secondly, since the main wall of the bottom/first floor of the KAC gallery is lined completely with windows, an enclosed space away from outside light kept the treatment phase more consistent with more controlled lighting. Third, both the Gallery Coordinator at KAC and the curator of the exhibition expressed interest in the study being confined to the specific room either due to logistical or artistic reasons. Lastly, the position of the room on the second gallery floor offered an optimal place for the lead researcher to intercept potential participants when collecting data.

The neutral color of the wall for the control phase, *Silk Pillow*, was chosen by KAC staff. The yellow color in the treatment phase, Farrow & Ball's *Babouche 223*, was chosen through a process of elimination. First, several colors were eliminated based on the limited amount of respected literature in the field of color psychology. Looking at the primary colors, the researcher and curator of the exhibition narrowed the options even more based on the artwork which would be on display in the room for the exhibition. The color red was eliminated quickly due to several pieces consisting of the color themselves. The researcher allowed the final color to be chosen by the curator. After comparing several tones of blue and yellow to a scale model of the gallery, the curator choose the color yellow. Next, the researcher and curator choose the tone or the shade of yellow. The researcher confirmed the final color through Dr. Steven Buck, a color psychologist at the University of Washington and a committee member for this thesis study, to ensure the choice was adequate as well as with staff at KAC. The researcher secured paint donations through the initial paint corporation who inspired the study, Farrow & Ball. The final color, *Babouche 223*, was determined by the lead researcher after comparing the final color swatch the curator chose to available colors Farrow & Ball produce. The Light Reflectance Value (LRV) for *Babouche 223*

is 47.93. Below, Photographs 2 & 3 compare the wall color between both groups, treatment and control. Complete photographs comparing phases are located in Appendix C.

Photographs 2 & 3 : Comparing Treatment and Control Wall Color



Photograph 2: Treatment / Babouche 223



Photograph 3: Control / Silk Pillow

Data Collection Protocol

With the approval by the University of Washington's Internal Review Board, this study utilized interviews to collect data from participants. The instrument utilized was adapted from instruments found in previous research with similar goals, including Reagan Forrest's *Perceived Atmosphere Instrument* (Forrest, 2014) and Brianna Brenner's thesis on music within a exhibition (Brenner, 2016). The full instrument can be found in Appendix C. Data were collected during the exhibition's duration, March 10 - April 29, 2017. Data were collected during normal, business hours for KAC, Tuesday - Saturday, at varying times by the researcher.

Due to a request from the curator, the study started with the treatment phase first, followed by the control phase halfway through the exhibition duration. During data collection, the lead researcher stationed herself on the second floor gallery off towards the right of the

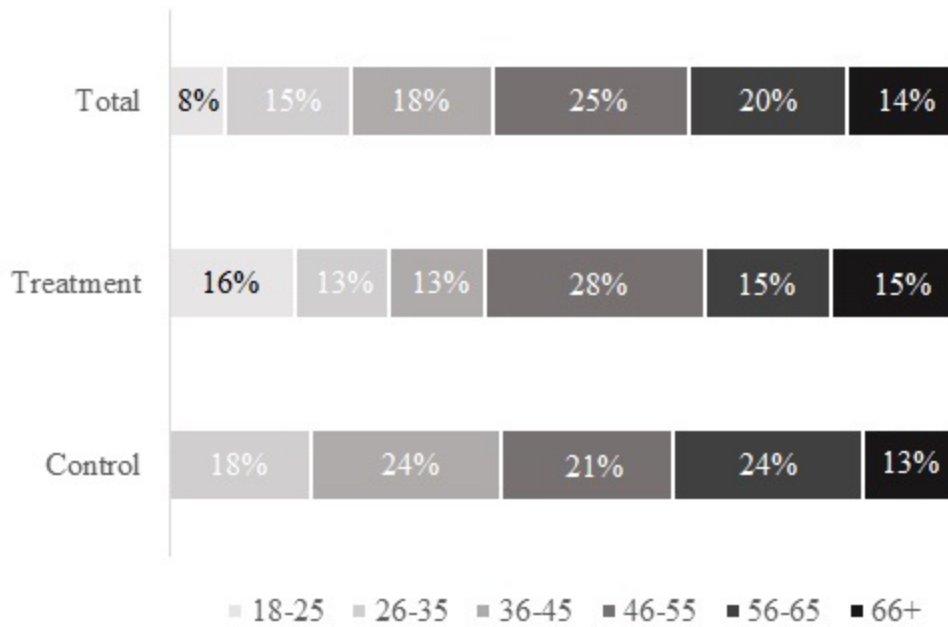
entrance/exit of the enclosed room. When gallery visitors 18 years or older entered the room, the researcher started a timer to record their stay time. When the visitor(s) exited the room, the researcher stopped the timer and approached them to participate in the study. If the visitor(s) agreed to participate after hearing the study's introduction and consent form, then the researcher continued with the guided questionnaire. For the control phase, after the variable was changed/walls were painted back to *Silk Pillow*, the researcher started the consent script asking if the visitors were viewing the exhibition for the first time. If the answer was no, then the researcher would thank them and not continue with the consent script. If the answer was yes, then the researcher followed the consent script as previously.

With KAC's historically low attendance, every visitor who walked into the second floor room and viewed the exhibition was approached. If there was a group of adults together in the gallery, the lead researcher approached the group as a whole and interviewed each person who volunteered. The full questionnaire can be located in Appendix C for reference.

Description of Sample

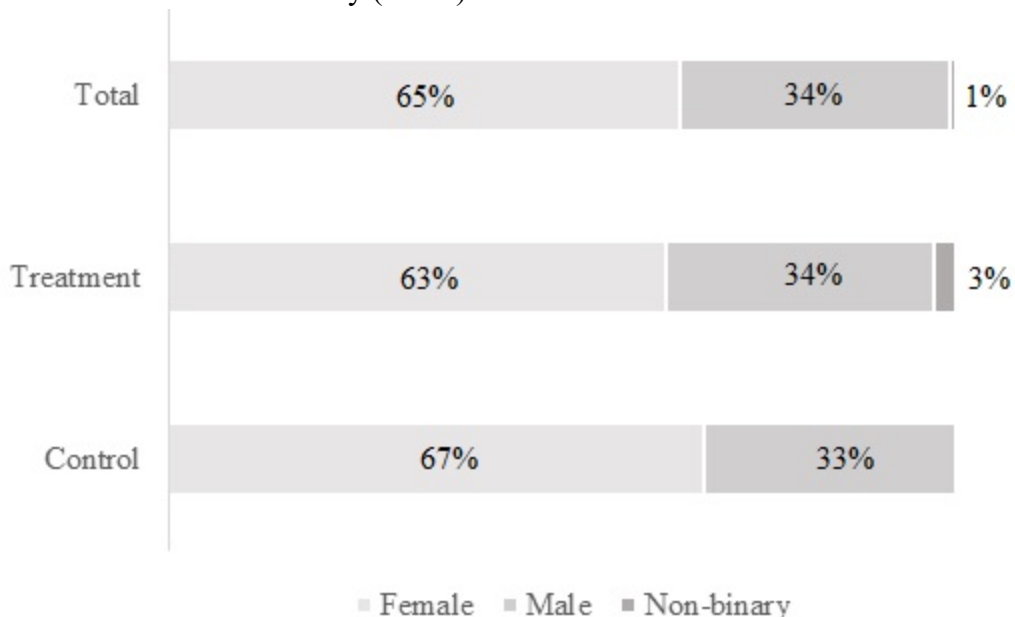
A total of 65 visitors participated in the study overall: 32 in the treatment phase and 33 in the control phase. Visitors were asked simple demographic information including, age range, gender, and zip code. The control phase was slightly older in age than the treatment phase, with five participants belonging to the 18-25 age range in the treatment phase and zero in the control phase. For a detailed report, Figure 1 below describes the age range distribution of the whole sample, then by the treatment group and control group respectively.

Figure 1: Age Range Distribution of Sample (N=65)



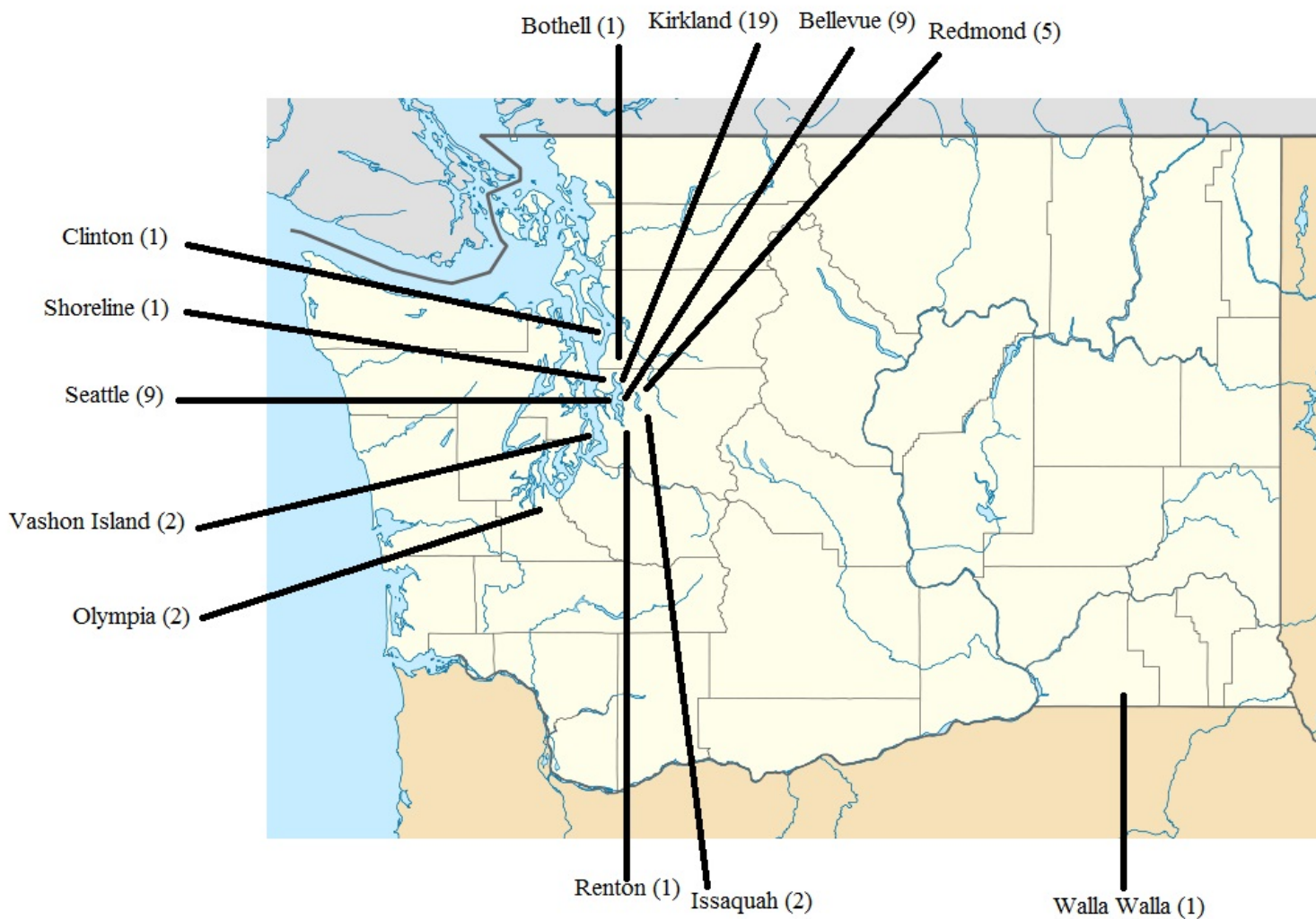
Overall, the sample was predominantly female with 42 participants, or 65%, identifying as female. The gender ratio between phases was remarkably equal. During the treatment phase, one participant identified as nonbinary, neither female nor male. Below, Figure 2 describes the gender distribution which participants identify with. The whole sample is looked at first, then followed by each phase respectively.

Figure 2: Gender of Visitors in Study (N=65)



Overall, the sample was local with 82% of the participants from Washington State. Only 3 participants, 5%, came from out of state: 1 participant from Idaho and 2 participants from New York. Nine participants choose not to include their zip code when answering the demographic questions. Below, Figure 3 breaks down the number of participants by local city.

Figure 3: Location of Visitors in Study from Washington State (N=53)



In addition to demographics, the researcher recorded group composition and how often participants visited KAC. Overall, participants either visited KAC alone or with another adult. Only 8% of the sample visited the gallery with children. Groups tended to be few in number as well with 97% of the sample visiting KAC with 1-3 people in their group. Below, Figures 4 and 5 break down the entire sample by group composition, followed by each phase respectively.

Figure 4: Group Composition of Participants in Study - Dynamics (N=65)

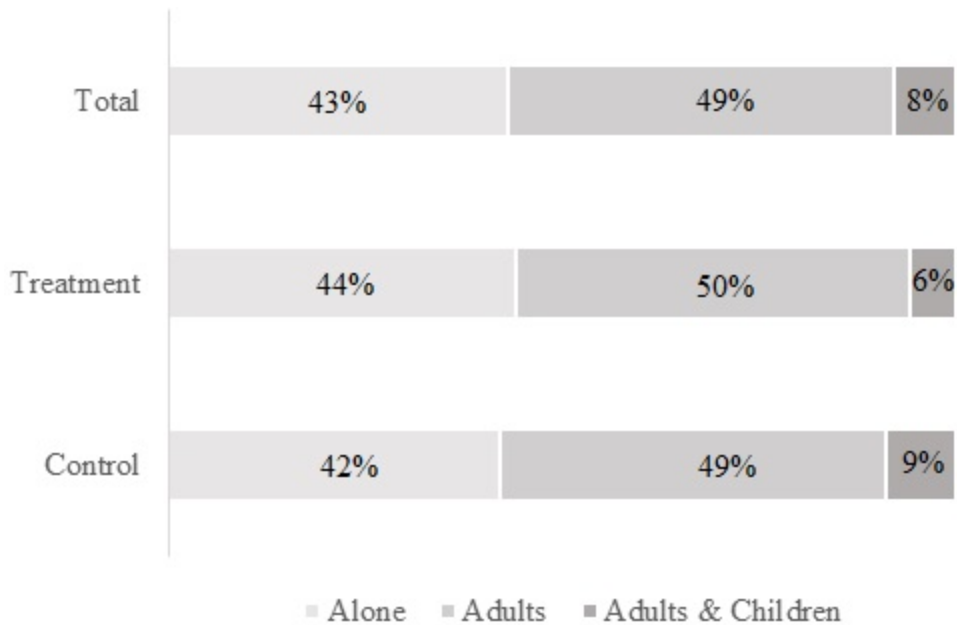
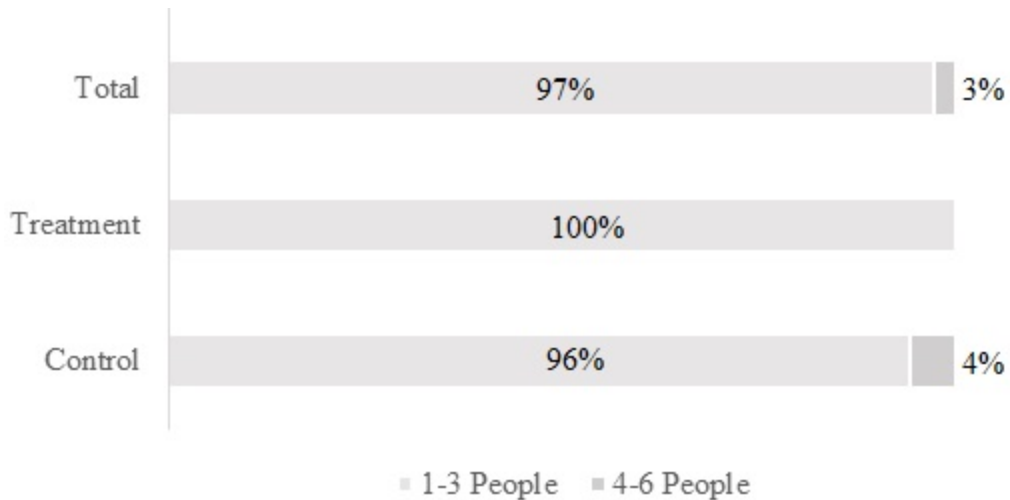
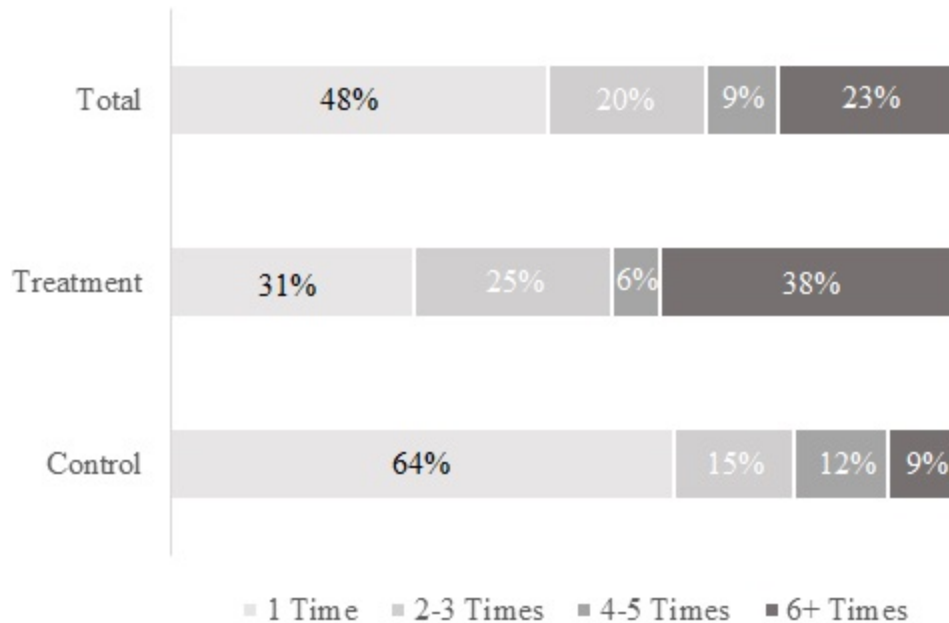


Figure 5: Group Composition of Participants in Study - Size (N=65)



The sample was asked to indicate how many times they have visited the KAC gallery in the last 12 months. The treatment phase had more participants who had visited KAC more frequently with 38% of the participants having visited KAC six or more times in the last 12 months compared to only 9% in the control phase. This difference in visitorship may be from an article The Seattle Times wrote about the exhibition halfway through the show's duration, drawing in more first-time-visitors intrigued by the article during the control phase than the treatment phase. Below, Figure 6 demonstrates the visitation patterns for the entire sample, then follows with the breakdown of each phase.

Figure 6: Visitation Frequency of Participants in Study (N=65)



Analysis Procedure

For the two open-ended questions, the researcher compared the data for themes and developed a coding rubric which can be found in Appendix D for reference. Multiple codes were

allowed for individual responses which had them. Double coding was allowed only for the second open-ended question when participants mentioned specific works of art. After the initial coding was complete, the researcher had a volunteer complete Inter-Related Reliability for verification. The volunteer successfully coded their responses 70% to the researcher's.

All data were entered and analyzed using the Statistical Package for Social Sciences (SPSS). For demographics and open-ended questions, frequencies were compared overall and between phases. For the closed-ended/ranking questions, a nonparametric approach was used by comparing the modes between phases using the Mann-Whitney Test.

Limitations

The main limitation of this study was the instrument used. Early on in collecting data, it became apparent the questionnaire lacked an outlet for the participants to talk freely about wall color. Many participants talked out loud to themselves when answering the closed-ended/ranking questions when deciding their answer. To account for this limitation, the researcher wrote down every mention of color outside the open-ended questions in the margins of the questionnaire. This limitation could have been avoided if the researcher had piloted the instrument beforehand.

KAC's gallery is open Tuesday - Saturday. Periodically, however, the gallery was closed on Saturdays if volunteer staffing could not be obtained. The nature of the normal business hours, and unfortunately the inconsistent nature of staffing, led the researcher to collect data mainly on weekdays. The researcher decided to approach every visitor instead of a systematic or random sampling, to account for KAC's potential low attendance. Because of this decision, the researcher approached pairs and groups in the same manner as an individual visitor and

interviewed them the same as well. This method allowed the researcher to obtain a sufficient sample, but may have influenced participants' responses if they answered with other people.

A third limitation of this study was the limited amount of wall space which was painted. The gallery at the Kirkland Arts Center is two stories. This study narrowed the wall space to the gallery room on the second floor to account for transition time between research phases, budget restrictions, and curator vision. The smaller area of wall space made this study possible, but may have also impacted the results. When being interviewed, the visitors were asked to keep the entire exhibition in mind when answering. Since most of the exhibition's walls stayed white, this may have impacted the results during the treatment group. Other research conducted in the field similar to this study (Srivastava & Peel, 1968; Ponte, 1981; Kwallek & Lewis, 1990; Mahnke, 1996; Forrest 2014) designed their studies where the changing variable/wall color was throughout the entire environment, but this study was simply unable to do so.

Chapter Four: Results

This chapter describes the findings of this study in context of the study's four research questions:

- 1) How does wall color affect visitors' stay time in an exhibition?
- 2) How does wall color affect visitors' emotions in an exhibition?
- 3) How does wall color affect visitors' comfort in an exhibition?
- 4) How does wall color affect visitors' perceptions of the artwork on the wall?

1) *How does wall color affect visitors' stay time in the exhibition?*

Visitors were timed upon entering the 2nd floor gallery room. Below, Table 1 shows the range and averages for the entire sample, followed by the treatment and control groups respectively. For the entire sample, time spent in the room ranged from 14 seconds to almost 4 minutes. Although the control group spent an average of 19 seconds longer in the gallery room than the treatment group, the difference was not statistically significant.

Table 1: Visitor Time Spent Inside Gallery Room

	Minimum	Maximum	Mean
Entire Sample (N=65)	00:14.62	03:45.34	01:40.82
Treatment Group (N=32)	00:22.44	02:49.40	01:31.17
Control Group (N=33)	00:14.62	03:45.34	01:50.17

2) *How does wall color affect visitors' emotions in the exhibition?*

Visitors were asked to indicate how the exhibition made them feel by rating their agreement with a series of 8 different statements regarding emotions using a 5 point scale from

Strongly Disagree (1) to Strongly Agree (5): *anxious, bored, calm, excited, happy, intrigued, irritated, and sad*. Below, Table 2 shows the average ratings for each emotion. Overall, there were no significant differences in ratings between the treatment and control groups.

Table 2: Participants ratings of how the exhibition made them feel (scale=1 strongly disagree to 5 strongly agree)

	Entire Sample's Mean (N=65)	Treatment Group's Mean (N=32)	Control Group's Mean (N=33)	Conclusion	Statistically Significant? (p<0.05)
Intrigued	4.17	4.06	4.27	Agree	No
Excited	3.49	3.53	3.45	Neutral	No
Happy	3.28	3.25	3.30	Neutral	No
Calm	2.91	2.84	2.97	Disagree	No
Sad	2.72	2.66	2.79	Disagree	No
Anxious	2.23	2.22	2.24	Disagree	No
Irritated	2.11	2.31	1.91	Disagree	No
Bored	1.63	1.75	1.52	Strongly Disagree	No

3) How does wall color affect visitors' comfort in the exhibition?

Using a 7 point scale with neutral in the middle and each adjective on either side, participants reflected on the overall gallery environment according to the following pairs of adjective: *dark/light, vibrant/dull, colorful/bland, dynamic/static, energetic/relaxed, and warm/cold*. Below, Table 3 displays the average ratings for the total sample, and for the treatment and control groups. On two of the six measures of comfort, there were significant

differences between the treatment and control groups: *vibrant/dull*, where the treatment group rated the exhibit more vibrant (0.03) than the control group; and *colorful/bland*, where the treatment group rated the exhibit more colorful (0.006) than the control group.

Table 3: Participants ratings of comfort in the gallery

	Entire Sample's Mean (N=65)	Treatment Group's Mean (N=32)	Control Group's Mean (N=33)	Conclusion	Statistically Significant? ($p < 0.05$)
(1) Dark/Light (7)	5.17	5.06	5.27	Light	No
(1) Energetic/Relaxed (7)	4.43	4.41	4.45	Relaxed	No
(1) Colorful/Bland (7)	3.35	2.91	3.79	Colorful	Yes
(1) Dynamic/Static (7)	3.43	3.53	3.33	Dynamic	No
(1) Warm/Cold (7)	3.14	3.25	3.03	Warm	No
(1) Vibrant/Dull (7)	2.94	2.56	3.30	Vibrant	Yes

Visitors were presented with a second likert scale and asked to indicate how much they agreed with a series of 5 different statements regarding their experience inside the exhibition. Using a 5 point scale from Strongly Disagree (1) to Strongly Agree (5), visitors reflected on the following statements: *It is enjoyable to spend time in this environment*; *This exhibit is visually appealing*; *This exhibit engages my visual senses*; *I had a worthwhile experience in this exhibition*; and *I'm glad I came and saw this exhibit*. Below, Table 4 shows the average ratings for each statement for the entire sample, and for the treatment and control groups. There were no significant differences in ratings between the two groups.

Table 4: Participants' ratings of their experience in the gallery (scale =1 strongly disagree to 5 strongly agree)

	Entire Sample's Mean (N=65)	Treatment Group's Mean (N=32)	Control Group's Mean (N=33)	Conclusion	Statistically Significant? (p<0.05)
I'm glad I came and saw this exhibition.	4.49	4.53	4.45	Agree	No
I had a worthwhile experience in this exhibition.	4.45	4.50	4.39	Agree	No
This exhibition engages my visual senses.	4.37	4.22	4.52	Agree	No
It is enjoyable to spend time in this environment	4.22	4.16	4.27	Agree	No
This exhibition is visually appealing.	4.20	4.19	4.21	Agree	No

4) *Does wall color affect visitors' perceptions of the artwork on the wall?*

Visitors were presented with a likert scale and asked to indicate how much they agreed with 3 different statements regarding their experience inside the exhibition, using a 5 point scale from Strongly Disagree (1) to Strongly Agree (5): *This exhibit's design helped me understand what the exhibit is about; The artwork in this exhibit is represented well; and The wall color in this exhibit influenced how I looked at the artwork.* Below, Table 5 presents the average ratings for the overall sample, and for the treatment and control groups. Again, there were no significant differences in ratings between the treatment and control groups

Table 5: Participants' ratings of the exhibition's design (scale=1 strongly disagree to 5 strongly agree)

	Entire Sample's Mean (N=65)	Treatment Group's Mean (N=32)	Control Group's Mean (N=33)	Conclusion	Statistically Significant? (p<0.05)
The artwork in this exhibition is represented well.	4.14	4.16	4.12	Agree	No
This exhibition's design helped me understand what the exhibition is about.	3.54	3.69	3.39	Neutral	No
The wall color in this exhibition influenced how I looked at the artwork.	3.49	3.66	3.33	Neutral	No

Visitors were presented with an open-ended question: *"In your own words, what do you think this exhibit is about?"* Visitors' responses were coded into five different categories: 1) Technology In General; 2) Specific Technology; 3) Impact of Technology; 4) General Art Comments; and 5) Other. Multiple codes were allowed for each response, if a visitor's response fit more than one code. The complete Coding Rubric can be found in Appendix D. Below, Table 6 demonstrates the distribution of categories across the entire sample, and within the treatment and control groups. Overall, there were no statistically significant differences between the groups. In general, both groups thought the exhibit was about the impact of technology. Examples of responses include: "Technology and its effects on people;" "I think it's about technology and the way it influences our culture;" and "It's about identity and how we experience different things".

Table 6: Frequency of Visitors' Responses by Code for Question: "*In your own words, what do you think this exhibit is about?*"

	Entire Sample (N=65)	Treatment Group (N=32)	Control Group (N=33)	Statistically Significant? (p<.05)
Code 3: Impact of Technology	48	23	25	No
Code 1: Technology In General	24	13	11	No
Code 2: Specific Technology	15	6	9	No
Code 5: Other	8	3	5	No
Code 4: General Art Comments	4	2	2	No

Since there were no statistically significant differences between the groups, the researcher asked the curator of the exhibit to answer the same question: "*In your own words, what do you think this exhibit is about?*" The curator's response was as follows: "The role of technology in our everyday lives, specifically in regards to how it can facilitate or hinder communication and human interaction." Data from the study sample was then recoded in terms of whether it aligned with this response. Below, Table 7 shows the distribution of this recoding, and suggests that the two groups were remarkably similar.

Table 7: Frequency of Visitors' Responses Matched to Curator's Response to Question 1: *"In your own words, what do you think this exhibit is about?"*

	Yes	No
Entire Sample (N=65)	51	14
Treatment Group (N=32)	26	6
Control Group (N=33)	25	8

Visitors were presented with a second open-ended question: *"Was there anything about this exhibition that stood out to you?"* Responses were coded into seven different categories: 1) Diverse Mediums; 2) Quality of the Exhibit and/or Artwork; 3) Thematic; 4) Interactive(s); 5) Specific Artwork; 6) Treatment; and 7) Other. Multiple codes were allowed for each response, if a visitor's response fit more than one code. The complete Coding Rubric can be found in Appendix D. Below, Table 8 shows the distribution of responses across categories, for both the treatment and control groups. Overall, there were no statistically significant differences between the groups except for Code 7: Other. The treatment group had more visitors than the control group who could not distinguish anything in particular about the exhibition. Examples of these responses included: "I'm not sure anything really stood out. Some (artwork) prompted a chuckle here and there. But nothing made me go wow;" "Um... (looked around) not really;" and "I don't know..."

In general, both groups singled out specific works of art the most. The exhibit's interactives were mentioned frequently as well. Examples of responses include: "Voting was wonderful. It brings your awareness to how much you use technology", "I really like the

interactive. It was fun.”, and “Definitely the interactive with the coins. Made me feel more engaged and curious.” Participants also highlighted the diverse mediums on display throughout the exhibition and the overall quality of the artwork or exhibition. Examples include: “Especially impressed with how many media there is in this exhibit. There’s a lot going on here”, “Continuity. And obvious curatorial care”, and “Most exhibits help you see a theme, and this did a good job”.

Table 8: Frequency of Visitors’ Responses by Code for Question 2: “*Was there anything about this exhibition that stood out to you?*”

	Entire Sample (N=65)	Treatment Group (N=32)	Control Group (N=33)	Statistically Significant? (p<.05)
Code 5: Specific Artwork	33	15	18	No
Code 4: Interactive(s)	16	8	8	No
Code 2: Quality of Exhibit and/or Artwork	13	7	6	No
Code 1: Diverse Mediums	8	4	4	No
Code 3: Thematic	8	4	4	No
Code 7: Other	4	4	0	Yes
Code 6: Treatment	1	1	0	No

Since specific artwork was mentioned the most by visitors, the researcher recoded responses in this category into two different sets of subcategories based on the location of the art within the gallery: 1) downstairs or upstairs (where the treatment wall was located); and 2) on the treatment wall or not on the treatment wall. Overall, even though there were differences between the number of times specific artworks were mentioned, there were no statistically significant differences between treatment and control groups in terms of their references to artwork downstairs or upstairs, or in terms of their references to artwork on the treatment wall or not on the treatment wall (see Tables 9 & 10).

Table 9: Frequency of Artwork Location in Visitors' Responses - Downstairs vs. Upstairs

	Entire Sample	Treatment Group	Control Group	Statistically Significant? (p<.05)
Code 5a: Artwork Located Downstairs	17	7	10	No
Code 5b: Artwork Located Upstairs	35	15	20	No

Table 10: Frequency of Artwork Location in Visitors' Responses - Treatment vs. Non-treatment

	Entire Sample	Treatment Group	Control Group	Statistically Significant? (p<.05)
Code 5c: Artwork Located on Treatment Wall Area(s)	24	10	14	No
Code 5d: Artwork Not Located on Treatment Area(s)	30	12	18	No

Only one respondent mentioned the wall color specifically during their response to the second open-ended question. In addition to the responses prompted from the questions asked, the researcher also recorded every time visitors mentioned the wall color in any part of the interview. Thirteen visitors in both groups mentioned color outside the open-ended questions. The researcher coded these responses into 5 categories: 1) Agreement; 2) Disagreement; 3) Indifference; 4) Ambiguous Remarks; and 5) Psychology. The complete Coding Rubric can be found in Appendix D. Below, Table 11 shows the distribution of responses across categories, for the entire sample and for the treatment and control groups. Although the samples are small, there is some indication that the control group may have been more indifferent about the wall color than was the treatment group. Examples of these responses include: “I didn’t really notice it;” and “Oh, neutral because I didn’t really pay attention, but it looks like it’s all white. That makes sense.”

Table 11: Frequency of Visitor Responses Regarding Wall Color

	Entire Sample	Treatment Group	Control Group
Code 3: Indifference	10	2	8
Code 1: Agreement	7	5	2
Code 4: Ambiguous Remarks	5	4	1
Code 2: Disagreement	4	3	1
Code 5: Psychology	4	3	1

Overall, there were positive and negative comments from the visitors regarding wall color, both when the treatment wall was white and when it was yellow. Examples of positive responses included: “Yellow’s nice. Brightens things a little more” and “The walls are white which is good. They need to be.” An example of a negative response included: “It’s distracting. The color is too harsh. It’s a “in your face” color.”

Chapter Five: Conclusions & Implications

The purpose of this study was to explore whether or not the color of a wall within an exhibition affects the museum visitor's experience and if so, how and to what degree. Data were collected through 65 interviews with visitors who viewed the *(Dis)Connected* exhibition at the Kirkland Art Center's gallery. Treatment visitors were interviewed after seeing the exhibition with one bright, yellow feature wall, while control visitors were interviewed after seeing the exhibition with all white walls.

This study had four research questions which explored visitors' stay time, emotions, comfort, and understanding of the exhibition's message. This study was conducted mainly for museology professionals including curators and exhibit designers who are considering using wall color as an atmospheric tool inside an exhibition. However, other professionals outside the museum field, like interior designers, paint experts, and color theorists, may also benefit from this study. This chapter discusses the main conclusions the researcher found from this study and how these findings aid the museology field and the greater academic field in general.

Conclusions

Wall color does not necessarily impact visitor's stay time in an exhibition. Although the control group stayed an average of 19 seconds longer than the treatment group, the finding was not statistically significant. This difference in stay time cannot be contributed to the changing variable of wall color, but instead suggests the difference of stay time was by chance. This could be from the broad range of time visitors actually spent inside the gallery room with the shortest time being 14 seconds and the longest duration almost 4 minutes.

Research in atmospherics has suggested interior color can influence the time spent in a store (Bellizzi & Hite, 1992) and even help control traffic flow through a museum by impacting the pace visitors walk (Srivastava & Peel, 1968). In fact, the color yellow has been used on hallway walls by the education system when schools wanted to speed up children passing between classes (White, 2016). Although color in general, and the yellow color more specifically, have both been linked through research to impact time spent and/or travel time, this study does not add support to these claims.

Wall color does not seem to influence visitors' emotions within an exhibition. Eight different emotions were measured in this study including anxiousness, boredom, calmness, excitement, happiness, intrigue, irritation, and sadness. The groups' medians regarding these emotions were remarkably similar when compared against each other suggesting that wall color does not influence visitor's emotions within an exhibition. This supports several studies exploring color as an atmospheric tool within environments. For example, Louis Cheskin decorated four rooms entirely in one color for one of his studies. Although his research found participants had noticeable reactions, both mentally and biologically, between the red and blue rooms, the yellow room hardly impacted the participants (Mahnke, 1996). These findings suggest the treatment color for this study may not be as impactful or noticeable as other colors might be.

The limited amount of wall space which was painted for the study may have been another reason why wall color did not impact visitors' emotions. The gallery at the Kirkland Arts Center is two stories. This study narrowed the wall space to the gallery room on the second floor to account for transition time between research phases, budget restrictions, and curator vision. The smaller area of wall space made this study possible, but may have also impacted the results.

When interviewed, visitors were asked to keep the entire exhibition in mind when answering. Since most of the exhibition's walls stayed white, it is unclear whether or not the changing variable/wall color indeed was influential. Other research conducted in the field similar to this study (Srivastava & Peel, 1968; Ponte, 1981; Kwallek & Lewis, 1990; Mahnke, 1996; Forrest 2014) designed their studies where the changing variable/wall color was throughout the entire environment. Overall, this study suggests wall color does not impact visitors' emotions within an exhibition when only one wall is colored, but it is undetermined whether or not these same findings would apply if all of the walls had been colored.

Wall color may influence visitors' comfort within an exhibition. When asked to describe the overall exhibition environment, the treatment group found the exhibit to be more vibrant and colorful than the control group. This may be beneficial information for a gallery located in the rainy Puget Sound or any other museum looking to brighten their exhibition space. To say this difference impacts visitors' comfort would need to be explored more deeply, especially since no other statistically significant differences were found between the groups, control and treatment, regarding visitor comfortability.

Wall color may influence visitors' engagement with the exhibition. The exhibition *(Dis)Connected* had a strong exhibit message which almost every visitor picked up on and was able to verbally communicate. Overall, there were no statistically significant differences between the groups regarding the message of the exhibition. When asked "*Was there anything about this exhibit that stood out to you?*", however, there was a difference between the groups. In general, every visitor in the control group was able to easily articulate a component that stood out to them whereas the treatment group had more trouble identifying something special. This may

suggest that wall color impacts visitors' engagement levels within an exhibition and therefore their ability to recall or remember something about it.

A study conducted by Tullman (2000), however, contradicts this observation. Tullman's study found that displays with colored backgrounds not only held visitors' attention longer but also encouraged them to interact more. Perhaps this difference between groups is due to the specific treatment color instead, a yellow produced by Farrow & Ball called Babouche 223. One visitor in this study commented on the treatment color as negative saying "It's distracting. The color is too harsh. It's an in-your-face color." Although not reflected through this study, other research surrounding the color psychology of yellow have agreed with this visitor finding the color to be irritating and/or distracting to people (Jacobs & Suess, 1975; Mahnke, 1996; Art, 2007). Whether or not the treatment color was indeed "distracting" which led visitors to be unable to single out a specific work of art would need further study, but may provide insight to this anomaly found in the data.

Overall, museum visitors do not notice wall color. Combined with the lack of statistically significant differences between groups, only 40% museum visitors verbally communicated to the researcher about wall color during the interview after hearing the statement "*The wall color in this exhibit influenced how I looked at the artwork.*" Of those conversations, 58% were indifferent or ambiguous in nature. Examples of these comments include: "Probably yes" and "Wall color always matters." Along with showing indifference towards the wall color, visitors also openly admitted to not noticing the wall color during the interview. Examples of these comments include: "Not that I'm aware of...", "I didn't really pay attention", and "I didn't notice the color." Although studies have shown that color in an "interior space can make a great

deal of difference in influencing a room's character, the way it is perceived psychologically, and subsequent reactions to it" this seemed not to be the case with this study (Mahnke, 1996, p.66).

This claim is further supported with data from visitors' responses to "*Was there anything about this exhibit that stood out to you?*" Although Grimley and Love (2007) found that color within an interior space can draw visitors' attention towards different elements, or in this study towards different works of art, this was not the case. There were no pieces of artwork that visitors mentioned more between the two groups, control and treatment.

Museum visitors may expect gallery walls to be white. Visitors across the sample commented the most about wall color needing to be white. Visitors displayed a range of emotions towards the exhibition's wall color, but acceptance or indifference towards a neutral wall color was by far the most. Example of these comments include: "*White is probably best*", "*Looks like it's all white. That makes sense,*" and "*The walls are white which is good. They need to be.*" Many visitors displayed these emotions, and on some occasions even insisted the white wall color was correct, when prompted with the statement "*The wall color in this exhibit influenced how I looked at the artwork*" during the interview. These emotions and/or statements by the visitors may be in part due to the fact that a white wall color is seen frequently in museums and galleries.

Perhaps museums have a bias towards neutral walls because of the many benefits that white wall color has for them, their visitors, and the artwork on display. Lord & Lord (2002) talk about these benefits. The color white is flexible and can more likely host more exhibitions than an unique color would be able to, thus saving organizations money from the cost and time it would take to repaint between shows. The color also reflects light and makes rooms appear larger

and more bright than they actually are. The color white also absorbs ultraviolet radiation, helping protect the artwork on display from being harmed by light coming inside the gallery from outside.

Implications

The major implication of this study is that museum visitors generally do not notice wall color, consciously or unconsciously. However, the lack of awareness is not necessarily bad. In fact, the Smithsonian Guidelines for Accessible Exhibition Design, state that gallery colors, including the color of floors, furniture, and walls, should create an environment that is comfortable and safe (Majewski, Mahoney, & Altman, 2016). The fact that visitors did not notice wall color may suggest they were comfortable in the gallery. One visitor remarked on this phenomenon between laughs, saying, “I work in a gallery, so if I didn’t notice it, I guess it’s doing a good job.” The next step for museum professionals would be to decide whether or not it is “good” or “bad” if museum visitors do not notice the wall color within an exhibition. After deciding this, museum professionals can then brainstorm about their approach to deciding the wall colors within their institution.

Although wall color may not have mattered to gallery visitors, it mattered a great deal to the KAC staff. Prior to this study, the walls inside the KAC gallery had never been painted. While collecting data, staff members continually approached the researcher to talk about the yellow treatment color, Farrow & Ball’s Babouche 223. Conversations mainly surrounded how staff members liked the change, switching things up, and the excitement around new colors. After the treatment color was painted over with KAC’s traditional neutral color, Silk Pillow, staff members would approach the researcher and comment on how they missed the color. The Gallery Coordinator even commented how after the study is done, he might repaint the entire gallery back

to yellow.

As discussed earlier in the *Conclusions* section, museum visitors expected the walls to be white when prompted about the wall color inside the exhibition. Comments vocalized about this tradition included: “The walls are white which is good. They need to be,” “It looks like it’s all white. That makes sense,”, and “Shouldn’t be anything other than white!” The acceptance of white walls inside a gallery by the public prompts the question whether or not public perception of white walls will change if more museums like the MoMA start incorporating different wall colors into their exhibitions. A white wall inside a gallery has been known to be the norm for museums (Dernie, 2006). This study supports this stigma and even adds support towards continuing the trend.

The conversations with staff members at KAC, on the other hand, suggest that the tradition of white walls within a gallery should be examined. Although something is the norm, it does not mean it should not be challenged when appropriate. David Dernie (2006) warns museums from falling into the white-wall-trap and asks them to question whether their decisions for wall color within an exhibit are truly sound or simply out of convention. He states, “The predominance of the off-white modern gallery interior, for instance, would seem, because of its perceived neutrality, more a matter of convention than necessarily always appropriate” (p.163).

Future Research

Replicate the study utilizing color in the entire exhibition/gallery instead of a single room/space inside a larger exhibition. One of the largest limitations this study had was the changing variable, wall color, was not consistent throughout the entire exhibition. The decision to limit the research space, as opposed to using the entire exhibition, was based on several factors.

First and foremost, to expedite the transition between research phases, a smaller area of wall space would be quicker to paint than a multi-floored gallery. Secondly, since the main wall of the bottom/first floor of the KAC gallery is completely lined of windows, an enclosed space away from outside light would keep the treatment phase more consistent with controlled lighting. Third, both the Gallery Coordinator at KAC and the curator of the exhibit expressed interest in the study being confined to the specific room either due to logistical or artistic reasons. Although the researcher had to restrict the changing variable in this study, the study results may have been different if the treatment group experienced color throughout the entire gallery.

Replicate the study with more treatment phases and different colors. This was but one study completed with one treatment color: Farrow & Ball's Babouche 223, a bright yellow. This study aimed to see if wall color in general matters to museum visitors, but really, it found if visitors noticed a specific wall color, a bright yellow, in fact. Most visitors did not. To truly answer the research question: "Does wall color impact the visitor experience within an exhibit?" a larger study with multiple treatment groups will need to be conducted. Previous researchers have found this same realization with other studies regarding atmospherics, including Crowley (1993) who emphasized the importance different colors could make within the marketing sector: "In examining color response, we must first ask, What color? as the effects may be markedly different depending on the color of the ad" (p. 67).

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Appendix A

(Dis)Connected

March 11th - April 29, 2017



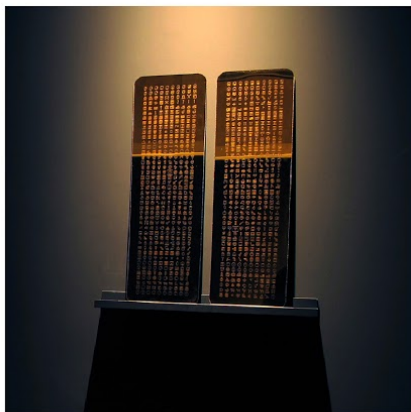
Exhibition Checklist



Humaira Abid
Fountainhead, 2016
Carved mahogany wood
\$3,250



Troy Gua
Love Sign, 2015
Enamel and resin on panel
NFS



Troy Gua
Modern Parlance, 2016
Laser etched golden mirror, acrylic, and shelf
\$1,000



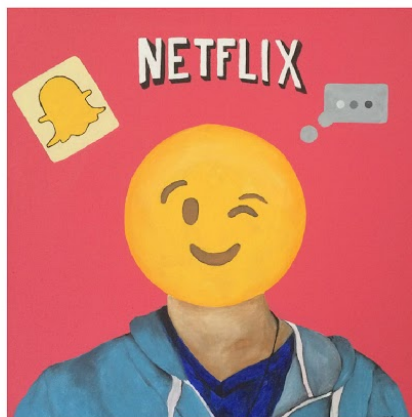
Troy Gua
Your Face Here, 2009
Vinyl, glass, wood
\$2,000

(Dis)Connected

March 11th - April 29, 2017



Exhibition Checklist



Nancy Her
Modern Romance, 2016
Acrylic on canvas
\$175



Nancy Her
Health Care, 2016
Acrylic on canvas
\$175



Nancy Her
High Quality Content, 2016
Acrylic on canvas
\$175



Shawn Huckins
The Wood Boat: Like Duh, 2016
Acrylic on canvas
\$6,000

(Dis)Connected

March 11th - April 29, 2017



Exhibition Checklist



Valerie Syposz
Validation of Existance, 2015
Lithograph
\$600 unframed, \$630 framed



Valerie Syposz
A Love Affair, 2016
Lithograph
\$700 unframed, \$735 framed



Jonathan Wakuda Fischer
MOGA YOLO FOMO II, 2016
Spray paint and mixed media on wood
\$1,800



Amy Spassov
Tune In / Tune Out, 2016
Mixed media on panel
\$6,400

(Dis)Connected

March 11th - April 29, 2017



Exhibition Checklist



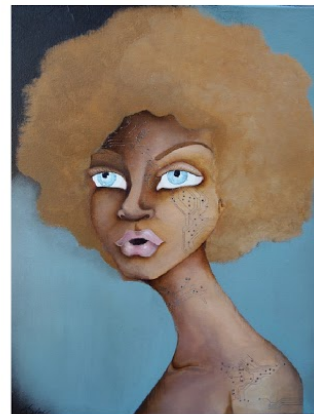
Vikram Madan

Triple-Selfie Portrait (A Tribute to Norman Rockwell), 2014
Acrylic on canvas
NFS



Leslie Harriel

Green Eyed Digital Fantasy, 2017
Mixed media on canvas
\$960



Leslie Harriel

Blue Eyed Digital Fantasy, 2017
Mixed media on canvas
\$960

(Dis)Connected

March 11th - April 29, 2017



Exhibition Checklist



Leslie Harriel
Red Eyed Digital Fantasy, 2017
Mixed media on canvas
\$960



Martin Langford
Remote, 1999
Mezzotint
\$180 unframed



Ben Moreau
Built for Sin/Lost to Apathy, 2005
Lithograph
\$300 unframed



Liao Yang
Where Are Parents?, 2014
Lithograph
\$1,250 unframed

(Dis)Connected

March 11th - April 29, 2017



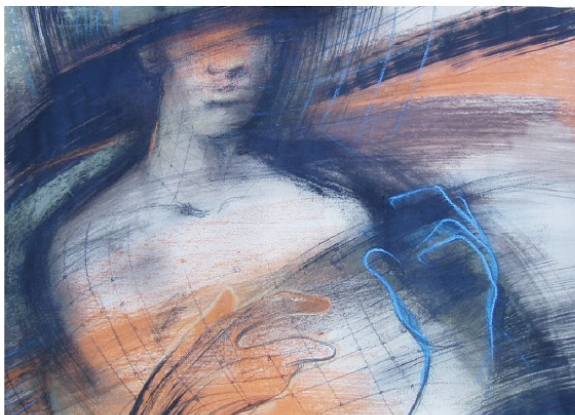
Exhibition Checklist



Igor Kashinsky
Love Triangle, 2012
Mixed media
\$550



Igor Kashinsky
New Vibration, 2009
Oil on canvas
\$2,600



Igor Kashinsky
Energy Grid, 2011
Mixed media
\$550



Igor Kashinsky
In the Zone, 2010
Oil on canvas
\$2,400

(Dis)Connected

March 11th - April 29, 2017



Exhibition Checklist



D. Lisa West
Morning E-mail, 2013
Oil on canvas
\$2,500



Patrick McGrath
Gen-X Daily Meal, 2015
Oil and gold leaf on panel
\$2,800



Patrick McGrath
The Creed, 2014
Oil on panel
\$4,000



Ries Niemi
When Your Only Tool is a Hammer, 2008
Embroidery on fabric, machined steel
\$1,500

(Dis)Connected

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Exhibition Checklist



Ries Niemi

New Standardds of Feminine Beauty, 2008

Inkjet, paint on paper

NFS



Ries Niemi

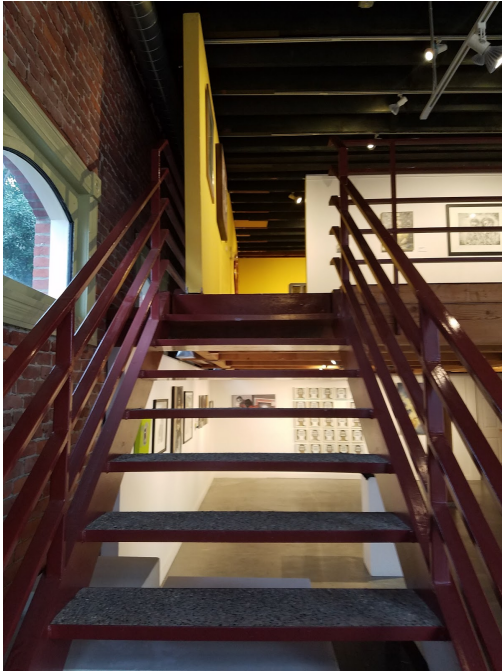
Cell Phone Bugs, 2008

Powdercoated steel

\$500 each

Appendix B

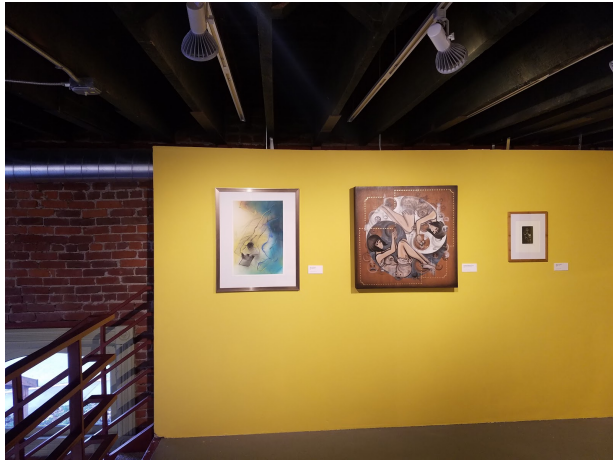
Treatment / Babouche 223



Control / Silk Pillow



Treatment / Babouche 223



Control / Silk Pillow



Appendix C

Has Seen Exhibit?	Duration in Exhibit	Date	Crowd Size <input type="radio"/> 1-3 <input type="radio"/> 4-6 <input type="radio"/> 6+	Group Composition <input type="radio"/> Alone <input type="radio"/> Adults <input type="radio"/> Adults with Children
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1) In your own words, what do you think this exhibition is about?

2) Was there anything about this exhibition that stood out to you?

Please take a moment and consider your surroundings in this exhibition

3) Now, please rank the following characteristics in relation to the environment. In other words, which word do you believe best describes the exhibition environment? The more you believe the word suits, the closer the ranking should be to that word. If you believe neither words in a pair applies, please choose the neutral ranking in the middle.

Neutral								
Dark	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Light
Vibrant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Dull
Colorful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Bland
Dynamic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Static
Energetic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Relaxed
Warm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Cold

4) Please indicate how much you agree with the following statements by choosing the appropriate circle for each emotion.

This exhibition made me feel...

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Anxious	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bored	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Calm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Excited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Happy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intrigued	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Irritated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5) Next, please indicate how much you agree with the following statements by choosing the appropriate circle.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
It is enjoyable to spend time in this environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This exhibition is visually appealing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This exhibition engages my visual senses.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This exhibition's design helped me understand what the exhibition is about.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The artwork in this exhibition is represented well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The wall color in this exhibition influenced how I looked at the artwork.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I had a worthwhile experience in this exhibition.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm glad I came and saw this exhibition.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please continue to the next page for the last portion of the questionnaire: Demographics.

If you choose to answer the following questions, please indicate the appropriate answer to the best of your ability. If you choose to waive this portion, please hand the questionnaire back the researcher to finish the survey, thank you!

6) In the last 12 months, how many times have you visited the KAC gallery?
(circle answer)

- 1 2-3 4-5 6+

7) Please indicate your age range:

- 18-25
 26-35
 36-45
 46-55
 56-65
 66+

8) What gender do you identify with?

- Female
 Male
 Non-binary
 Other _____
—

9) Please share your zip-code, or country if visiting from outside the United States.

Thank You!

Appendix D

Weekend vs Weekday

Variable	Code	Description
1	Weekend	Data was collected on a Saturday OR Sunday
2	Weekday	Data was collected during the week; Monday, Tuesday, Wednesday, Thursday, OR Friday

Crowd Size

Variable	Code	Description
1	1-3	The interview participant was either alone or came to the gallery with two other people.
2	4-6	The number of visitors in the group which the interview participant came from was between four and six people
3	6+	The number of visitors in the group which the interview participant came from was between four and six people

Group Composition

Variable	Code	Description
1	Alone	The interview participant was alone while visiting the gallery
2	Adults	The interview participant was a part of an adult-only group while visiting the gallery
3	Adults with Children	The interview participant was a part of a group consisting of adults and children while visiting the gallery

“In the last 12 months, how many times have you visited the KAC gallery?”

Variable	Code	Description
1	1	The interview participant has visited KAC once in the last 12 months
2	2-3	The interview participant has visited KAC 2-3 times in the last 12 months
3	4-5	The interview participant has visited KAC 4-5 times in the last 12 months
4	6+	The interview participant has visited KAC six or more times in the last 12 months

“Please indicate your age range”

Variable	Code	Description
1	18-25	The interview participant is between the ages 18-25 years old
2	26-35	The interview participant is between the ages 26-35 years old
3	36-45	The interview participant is between the ages 36-45 years old
4	46-55	The interview participant is between the ages 46-55 years old
5	56-65	The interview participant is between the ages 56-65 years old
6	66+	The interview participant is 66 years old or older

“What gender do you identify with?”

Variable	Code	Description
1	Female	The interview participant self-identifies as female
2	Male	The interview participant self-identifies as male
3	Non-binary	The interview participant self-identifies as non-binary
4	Other	The interview participant self-identifies with another gender term not listed on the questionnaire.

Question 3: “Now, please rank the following characteristics in relation to the environment.”

Variable	Code	Description
1	First column	First column marked on the left for the specific line measuring two opposite emotions
2	Second column	Second column from the left marked for the specific line measuring two opposite emotions
3	Third column	Third column from the left marked for the specific line measuring two opposite emotions
4	Neutral	Neutral marked for the specific line measuring two opposite emotions
5	Fifth column	Fifth column from the left marked for the specific line measuring two opposite emotions
6	Sixth column	Sixth column from the left marked for the specific line measuring two opposite emotions
7	Seventh column	Seventh column from the left marked for the specific line measuring two opposite emotions

Question 4: “Please indicate how much you agree with the following statements by choosing the appropriate circle for each emotion - This exhibit made me feel...”

Variable	Code	Description
1	Strongly Disagree	Participant marked <i>Strongly Disagree</i> for feeling the indicated emotion while in the exhibition
2	Disagree	Participant marked <i>Disagree</i> for feeling the indicated emotion while in the exhibition
3	Neutral	Participant marked <i>Neutral</i> for feeling the indicated emotion while in the exhibition
4	Agree	Participant marked <i>Agree</i> for feeling the indicated emotion while in the exhibition
5	Strongly Agree	Participant marked <i>Strongly Agree</i> for feeling the indicated emotion while in the exhibition

Question 5:”Next, please indicate how much you agree with the following statements by choosing the appropriate circle.”

Variable	Code	Description
1	Strongly Disagree	Participant marked <i>Strongly Disagree</i> towards the indicated sentence after viewing the exhibition
2	Disagree	Participant marked <i>Disagree</i> towards the indicated sentence after viewing the exhibition
3	Neutral	Participant marked <i>Neutral</i> towards the indicated sentence after viewing the exhibition
4	Agree	Participant marked <i>Agree</i> towards the indicated sentence after viewing the exhibition
5	Strongly Agree	Participant marked <i>Strongly Agree</i> towards the indicated sentence after viewing the exhibition

Question 1: “In your own words, what do you think this exhibition is about?”

Variable	Code	Description	Example(s)
1	Technology In General	The word “technology” is mentioned individually or in a general sense.	<ul style="list-style-type: none"> • “Technology” • “I think it’s about technology” • “It’s not quite about what I expected. By evidence of the artwork, it seems to be technology as a work. “ • “The whole exhibit? I would think technology is one of the themes. “
2	Specific Technology	Specific types of technology are mentioned including social media, the internet, and cell phones.	<ul style="list-style-type: none"> • “Social media” • “I think it’s about addiction of the internet.” • “I think it’s about technology and the way it influences our culture. It’s heavy on computer and digital technology. “ • “Technology. Cell phones in particular, mostly about I think.”
3	Impact of technology	The mention of technology and its impact, either positive or negative, on a variety of influences including oneself, others, society, and/or nature.	<ul style="list-style-type: none"> • “Technology and its effects on people” • “It’s about identity and how we experience different things.” • “I think it’s about technology and the way it influences our culture.” • “I think it’s about, well obviously the “Disconnection” between mechanical and nature.” • “Most of it seems to be about electronic media and how it is impacting our lives.”
4	General Art Comments	The mention of artistic styles and/or art in general	<ul style="list-style-type: none"> • “Russian icons is another theme that came to mind. Iconic images combined with technology.” • “It’s more figurative. See a lot of people,

			<p>figures? It's pretty mixed, not real consistent. Pretty diverse. So this is figurative, and this (walks into room) is more modern.”</p> <ul style="list-style-type: none"> ● “Very Creative. It's very creative. Something, how do I express that? Something beyond the wall. Something new, the future.”
5	Other	Respondent could not or did not answer the question or spoke about something not in relation to the exhibition.	<ul style="list-style-type: none"> ● “I don't know. I don't see a consistency yet, although I'm looking for only visual effects and not ideas.” ● “Mostly about communication” ● “Just looks like life experiences daily life experiences.”

Question 2: “Was there anything that stood out to you?”

Variable	Code	Description	Example(s)
1	Diverse Mediums	The mention of how many different mediums were used to create the exhibition.	<ul style="list-style-type: none"> ● “Especially impressed with how many media there is in this exhibit. There's a lot going on here.” ● “How even though each artist approaches the subject differently, a lot of the same messages come across.”
2	Quality of the exhibition and/or artwork	The mention of how well the exhibition was put together in terms of design and curation and/or the mention of how impressive the quality of the artwork is	<ul style="list-style-type: none"> ● “Continuity. And obvious curatorial care.” ● “ I was inspired by the level of art.” ● “There were some pieces. I like how some pieces made me laugh, some made me think, and others were really well done. I think that's what I liked best.”
3	Thematic	The mention of different themes the exhibition	<ul style="list-style-type: none"> ● “Loneliness. A lot of the pieces, that's what I got from them, a sense of being or feeling lonely and somewhat unaware of it.”

		either portrays or the respondent believes the exhibition portrays.	<ul style="list-style-type: none"> ● “Digital media. It’s very strongly embedded in the pieces. A very loud message.”
4	Interactive(s)	The mention of one or both of the exhibition interactives.	<ul style="list-style-type: none"> ● “Interaction aspect is cool. “ ● “Voting was wonderful. It brings your awareness to how much you use technology - almost have a guilty feeling of it.”
5	Specific Artwork Mentioned A) Downstairs B) Upstairs C) Treatment D) Non-Treatment	Specifically pointed out a piece of artwork.	<ul style="list-style-type: none"> ● “Specific pieces, first thing I saw was the “fountain head” and the mahogany piece (Humaira Abid, <i>Fountainhead</i>). Cool to see technical skills showing technology.” ● “A couple of pieces I liked. (Points to Igor Kashinsky, <i>New Vibration</i>). Not inherently about media, but inherently interesting and thought provoking.”
6	Treatment	Anything mentioned in relation to the treatment wall and/or room not counting specific artworks located in the area(s).	<ul style="list-style-type: none"> ● “Well, it’s weird for me to see this wall a different color. The yellow highlights the same room that is usually forgotten. Usually people forget or pass by this room, but the yellow draws them in, I think. Makes them want to go and spend time in the room. I like that it has a different color, that draws you in and see the pieces.”
7	Other	Respondent did not answer the question or spoke about something not in relation to the exhibition.	<ul style="list-style-type: none"> ● “Um... (looks around) not really. (<i>It’s okay if nothing popped out for you</i>). Yeah, nothing (laughs).” ● “I’m not sure anything really stood out. Some (artwork) prompted a chuckle here and there. But nothing made me go “wow”.”

Mention of Color Outside Open-Ended Questions

Variable	Code	Description	Example(s)
1	Yes	Color was mentioned outside an open-ended question	<ul style="list-style-type: none"> ● Yellow's nice. Brightens things a little more." ● "It's colorful with that yellow accent wall, so yes" ● "Center pieces would be better seen on certain wall colors. For example, this piece (Amy Spassov, <i>Tune-In, Tune-Out</i>) with the green would not have looked good up here. These (looks at artwork and nods)." ● "The walls are white which is good. They need to be. If they were any other color I would be bothered." ● "Shouldn't be anything other than white!"
2	White	The color white was mentioned	
3	Non-White	Colors besides white were mentioned, specifically the treatment color	

Themes of Color Outside Open-Ended Questions

Variable	Code	Description	Example(s)
1	Agreement	The mention of liking the color (either yellow or white) in relation to the exhibition.	<ul style="list-style-type: none"> ● Yellow's nice. Brightens things a little more." ● "It's colorful with that yellow accent wall, so yes" ● "Center pieces would be better seen on certain wall colors. For example, this piece (Amy Spassov, <i>Tune-In, Tune-Out</i>) with the

			<p>green would not have looked good up here. These (looks at artwork and nods).”</p> <ul style="list-style-type: none"> ● “The walls are white which is good. They need to be. If they were any other color I would be bothered.” ● “Shouldn’t be anything other than white!”
2	Disagreement	The mention of not liking the color yellow specifically in relation to the exhibition or galleries in general.	<ul style="list-style-type: none"> ● “Well, yes, I prefer white spaces.” ● “I think I would’ve liked the art better on the white walls. White works better. I imagine I’d have a different feel and see them (artwork on the yellow walls) differently on the white walls.” ● “Yes, negatively. It’s negative. (<i>why is it negative?</i>) It’s distracting. The color is too harsh. It’s a “in your face” color.”
3	Indifference	Verbally mentions how color in general did not matter or probably matters, but does not have an opinion or did not notice the wall color while viewing the exhibition.	<ul style="list-style-type: none"> ● “Um.....(takes steps forward and peers into room) no the I didn’t notice the color.” ● Probably yes... if it was green....or, all color would matter” ● “White is probably best.” ● “No... not consciously anyways” ● “Oh neutral because I didn’t really pay attention (looks around the gallery) but it looks like it’s all white. That makes sense.”
4	Ambiguous Remarks	The mention of color without any indication of preference.	<ul style="list-style-type: none"> ● “Oh, that yellow wall...” ● “Yellow makes things different. (<i>How is it different?</i>) It’s a little more...exclamation point” ● “This yellow wall man” ● “Well, color always...”

<p>5</p>	<p>Psychology</p>	<p>The mention of color impacting people's emotions and/or actions</p>	<ul style="list-style-type: none"> ● “Maybe the strong yellow wall. I think just the psychology of it says something. Maybe if it was blue... maybe because the yellow is very active it helps keep it (the exhibition) out of the negative. Good color psychology, if it was on purpose. I don't know if it was intentional by you or not, but either way, good choice.” ● “Interesting you mentioned wall color. Before I always thought white had to be the color, but you don't have to you know. I found this out a couple of years ago when we visited the boston museum of art. They had an exhibition where the walls were a mid-tone blue. Everyone hushed when they entered. The blue really influenced the emotions”
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