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How art therapy interacts with medicinal care and can improve patient outcome

Abstract

The impact of art therapy, specifically painting and studying painted works on patient coping, recovery, and healing is not highly researched and professionals commonly regard art therapy as only beneficial to an emotional extent on health. Problematically, there is not much data and clinical research collected or performed regarding the role of art therapy in a hospital setting, and research that exists often uses a small population, less than 50 persons, to determine conclusions. The aim of this research paper is to survey the available data and research regarding the integration of painting or studying paintings in a hospital or clinical environment on patient health outcomes. This paper determines if a more holistic approach to healing using art therapy over solely analgesics or other Western medicine methods of health intervention can impact patients of many different diseases in a positive way. Diseases studied alongside art therapy and discussed in this paper include but are not limited to, Alzheimer's, strokes, end-stage kidney failure, depression, Schizophrenia, Diabetes, PTSD, Cancer, and other Chronic illnesses. I used secondary research as the methodology for this paper, conducting a survey of the existing research. Many of the studies and research trials that were reviewed in this paper used interviews, questionnaires, regression analysis, and paired t-tests, as well as other quantitative measures. From my findings, I argue that the act of painting and studying paintings in a clinical setting does extend beyond creative expression and can positively impact holistic healing through neurobiology and biosocial mechanisms. Many quantitative metrics were used to determine the success of an art therapy intervention in this paper such as blood pressure, direct effects on a patient's functional recovery, length of stay in a hospital, and cortisol levels. Overall,

art therapy can prove beneficial to the medical community and patient interaction with painting and paintings should become more widespread in medical interventions.

Introduction

Art therapy has existed in varied forms since antiquity, however, not until the 20th century did art therapy expand and become more widespread in the healthcare setting. Still, Art therapy painting, viewing art, music rehabilitation, and more had been considered as only emotionally relaxing or soothing, up until the 21st century. Art used in the healthcare setting as therapeutic means that it is “a non-pharmacological approach to improving well-being and quality of life used in patients with cancer, neuropsychiatric diseases, and physical disabilities. In the past decade, the field of art therapy has undergone a shift toward novel application art-based activities, benefiting individuals other than patients with obvious health and wellness needs and expanding settings to include museums,” says Dr. Oliver Beauchet, Senior Investigator in the Division of Geriatric Medicine at Jewish General Hospital (Beauchet, 2020). Today, hospitals, medical institutions, clinics, geriatric centers, and other medicinal atmospheres are placing paintings on their walls and brushes in their patient’s hands. However, research on painting’s effects on a myriad of diseases and observing painting’s impact on illnesses, is still limited or shows correlation not causation at best. Some evidence that is both qualitative and quantitative does exist, and many research professionals and scientists argue that the intriguing overlap between art and medicine should be studied in more depth because of its potential impact on healthcare and the added benefits to traditional medical approaches.

Background

The saying Medicine is to prolong one's life as art is to express one's life captures how the majority of the population might only view art's intriguing and dynamic intersection with the medical world as superficial. Viewing art and art therapy have become regular tools to support patient emotional well-being in clinical and hospital settings. However, some forms of art, specifically painting, can aid patients beyond improving patient mood and actually affect the patient's road to recovery and health outcome through neurobiology, biosociology, and mental health impacts. It appears the current popular opinion on the impact of art therapy is that it can only provide emotional support to patients and patients families during times of illness or chronic disease. A 2004 Paper titled Evidence-Based Art by Professor of Sociology at Harvard University Matthew Baum concluded that "The humanities and the sciences have their particular roles in the practice of medicine. The notion of evidence-based art is as absurd as an Impressionist school of science," (Baum, 2004). However, I disagree with this notion that art does not have a place in the healing of patients.

Additionally, the integration of art therapy in the form of painting has faced challenges because of "misconceptions that art therapy is like arts and crafts, or it's as simple as taking some time to color or draw," states writer Gomez-Aldana (Gomez-Aldana, 2018). Another large challenge that is hindering many institutions across the United States from instituting art therapy programs is the lack of state licensing, which prevents art therapists from being covered by insurance. "Art therapy is finding its place in the mental health profession, but most states... [still] don't recognize it as its own profession," which is why research regarding the positive impact on patients is important to bringing art therapy into more institutions across the US (Gomez-Aldana, 2018). I agree with Gomez-Aldana and emphasize that the act of painting and studying painting in a clinical setting can extend beyond creative expression and instead impact

healing in a holistic sense and be used as a tool in medicine to directly effect a patient's functional recovery and length of stay in a hospital.

Art therapy in healthcare is used in a couple of distinctive ways. The two primary uses being display and exhibition of works to provide a therapeutic and beneficial environment, and participation by patients in painting through healing art therapy. Creative art therapies have in fact been used in the United States since the 1930's, and scholars suggest that arts in healthcare are "emerging as well, in alignment with the national and global priority to enhance population health through wellness and prevention" (Center for Arts in Medicine University of Florida, n.d.). If art therapies, in the form of painting and studying paintings, are in line with current trends aimed at improving holistic care, and research shows positive outcomes on patients, it is an important contemporary topic of discussion for healthcare professionals and for further research.

There is a range of research regarding art usage for patients affected by chronic diseases and various other clinical conditions, however, a common theme prior to 2004 is that art and specifically paintings, are used only as a means of calming patients in hospital settings. Even after 2004, many critics and scholars still believe that the patient journey and the illness experience are only impacted by art through minute feelings of pleasure or recognition of beauty when viewing art in the hospital or clinic (Smith, 2020). The illness experience can be defined as a social influence on the process of experiencing your illness and the way a patient interprets their illness in a sociological context. I believe art can contribute to healing in a holistic sense, it cannot replace Western medicine, nor should it, but it can be used more in the medicinal setting alongside medical interventions to amplify care. In a 2014 research paper regarding art therapy's impact on Alzheimer's disease and other dementias, performed because of the lack of

pharmacological treatments for limiting Alzheimer symptom onset, features Dr. Bree Chancellor and her team. I agree with Dr. Bree Chancellor, a Neurosurgeon at New York University Langone Medical Center and Bellevue Hospital in her conclusions that painting is one of the primary forms of art therapy used by healthcare providers to aid patient care. “One way that art has been used in a health care setting is with art therapy, in which artists, facilitators, and mental health professionals use art materials to help people... through painting” (Chancellor et al, 2014). This paper will focus specifically on the act of therapeutic painting aimed at aiding patients, and the viewing or observing of painted works for the purpose of benefiting a patient’s course of care.

Neuroscience studies on how painting and viewing paintings affect the brain are limited. This is a concern considering a holistic approach to medicinal interventions could aid brain-based diseases, based on the few but exemplary clinical research studies that will be presented in this paper. Painting has the ability to impact patient’s experience, therapeutic benefits, and serves as an avenue into the brain’s neurological behavior. Research shows that painting can improve many conditions, specifically neuro-based diseases or mental health problems such as Alzheimer’s, strokes, depression, and schizophrenia. Thus, this thesis will serve as an inquiry into neurobiological and biosocial effects on patients when viewing paintings and performing painting, and how this can extend beyond creative expression. A survey of the current research and conclusions available regarding painting and patient outcome can exemplify how art can be used to enhance the patient experience and ultimately aid a patient’s course of care. It is important to note that more research should be investigated and undertaken regarding the intersection between art and medicine. Current overlaps between art and medicine do exist outside the scope of painting and studying paintings, such as investigation into creative writing

or how music therapy can help premature babies with arrhythmia or weight problems return to a more normal heart rhythm or weight. Modern medicine labels this therapeutic medical approach and intervention as Cognitive Music Therapy, or CMT. This concept, like the process of painting for patients, is inextricably tied to neurobiology, according to Joanne Loewy, the head of the Louis Armstrong Center for Music and Medicine at Beth Israel Medical Center in New York (Reuters, 2013).

Historically, art has influenced the innovation of medicine, and art is being used now, in a clinical context, to influence the condition of the patient as well as patient outcome among a myriad of diseases. The origins of paintings in medicinal settings and certain painters themselves, primarily in the 20th century, have impacted medical advancements. It is important to turn to some of the most interesting and impactful of these examples to gain a proper historical context on the intersection between painting usage and clinical care.

Historical Context

The history woven between painting and medicine is thick and permeates literature and historical references: from Leonardo da Vinci's intertwined interests in both science and art to modern physicians and surgeons who are also painters. One example of a somewhat contemporary view on the intersection between the two can be found in Vienna, Austria. Vienna was once the center of medicine and medicinal advancements in the 19th and 20th century, and in 1894 the University of Vienna School of Medicine, led by pathologist Carl Von Rokitansky, commissioned renown Art Nouveau painter Gustav Klimt to create a series of paintings for the ceilings of the halls of the University (Pereda, 2019). This expansion of novel art within the School of Medicine's walls mirrored the expansion and developments of medicine, psychology,

and science in Vienna and the rest of the world. Klimt's creation of the series spanned almost a decade from 1900-1907, however, they failed to ever be displayed on the ceilings of the buildings after intense criticism of how medicine was portrayed in the paintings. These works "illuminate common ground between art and science, and highlight ongoing tensions in the relationships between art, science, and society" (Pereda, 2019). This is an important concept and mirrors tensions that still exist in implementing art therapy into medicinal settings and the attitudes on art therapy as not physically beneficial.

In one of Klimt's paintings, the sublime work *Medicine*, there is a column of semi-nude figures that breach a river signifying life, but the eye is taken to the bottom of the image to a depiction of Hygieia. Hygieia is the Greek mythological daughter of Aesculapian, the god of medicine, and the goddess of healing Epione. Critics claim that the work only blends the motifs and existential ideas of life and death, failing to celebrate medicine or the science of healing. The image of Hygieia has her back turned on the column of human life and was thought to signify how medicine cannot alter our fate as we are only born to die. However, modern onlookers believe she is not turning her back on life but instead challenging medicine to continue improving upon itself and extending the golden age of improvement and innovation. As the writer and critic Jorge Luis Borges once stated that art is a search for answers to questions of life and death, there can also be a comparison that this too is the purpose of medicine and the scientists who are driven on their quests of knowledge to determine how to impact life and slow death. Contemporary critic at Albert Einstein College in New York, New York, Alberto E. Pereda, argues that "Klimt had an intuitive understanding of medicine that more adequately described its real nature, an imperfect tool that mankind created to alleviate pain, rather than the grandiose voluntarist perspective of health professionals and university administrators of its

time” (Pereda, 2019). Overall, this painting mimics the impact and significance of art, expression, and innovation of the human mind and incites medicinal practices that would take place in the coming century. This anecdote shows an interaction between painting and medicine that has inspired and intrigued artists, scientists, educators, and medical professionals for over 110 years, and this can be further used as a foundation to discuss how paintings can impact the patient’s experience and outcome in an actual medical setting.

Many other renown painters have influenced medicine and advancements in scientific fields. For Wassily Kandinsky, a 20th century Russian painter and pioneer of abstract art, his diagnosis of the neurobiological phenomenon of synesthesia led to his numerous improvised works. This rare medical condition presented itself for Kandinsky as the intertwined senses of sound and vision, which would interplay in his artwork as he listened to compositions by Wagner and Schönberg and colors presented themselves on the canvases in front of him exactly matched to the tunes he was hearing. In fact, his famous works inspired intrigue and more research into the concept of synesthesia and neurobiology behind similar phenomenon. Research involving synesthesia has also resulted in numerical advancements in other fields of cognition, neurobiology, and sociology.

Similarly, in 1921 Swiss psychiatrist Hermann Rorschach followed Leonardo da Vinci’s and Botticelli’s Renaissance and Baroque ideas of assessing individual’s mental health according to art. The same concept of using art as a tool in medicine had been explored by more contemporary scientists, physicians, and psychologists as well, such as Alfred Binet and Dr. Justinus Kerner, both infamous in Europe for psychological advancements. Rorschach developed hand painted inkblots after studying 300 mentally ill patients and 100 control subjects, meaning to use paintings for screening and determining psychological conditions in patients before other

symptoms presented themselves, such as schizophrenia. In the 1960's, these painted inkblots were the most widely used projective test in the world for diagnosing, personality testing, and pathology. Researcher James M. Wood in the Department of Psychology at the University of Texas speaks of proponents of the Rorschach inkblots tests in the mid 1900's as "devotees [who] were fond of comparing its supposed penetrating powers to those of an X-ray" (Wood, 2003). Although the Rorschach test had come under scrutiny in the late 20th century regarding objectivity of the provider during administration of the test, extensive research in the 1990's and into the 2000's excited by the Rorschach inkblot tests, helped uncover more symptoms for diagnosing schizophrenia and other mental health conditions that to this day can be found in the DSM-5.

The history of art in medicinal settings begins in the middle ages when the concept of a hospital grew from hostels run by churches for pilgrims making their way across Europe to see Saint relics or other religious objects meant to heal and give good fortune. However, the contemporary history of art therapy only reemerges with actual intent on aiding patient care in 1915 with a philanthropist and teacher in New York City, Margaret Naumburg (Altman, 2009). Naumburg believed that there could be cognitive and verbal aspects of healing through painting that could take place in children diagnosed with Schizophrenia. However, "the emergence of art therapy as a profession arose independently and simultaneously in the United States and Europe," in the mid to late 1900's (GoodTherapy, n.d.). The actual term "art therapy" was not officially coined until 1942, when British Artist Adrian Hill discovered the lasting impact and benefit from drawing and painting while recovering from tuberculosis.

It is interesting to note that the narrative created by society and art historians regarding exceptional painters is that of people with extreme mental health problems, tumultuous physical

health, and unhealthy habits. Examples include Vincent Van Gogh who famously struggled with manic depression, alcohol abuse, lead poisoning, and temporal lobe epilepsy—it is even proposed that absinthe overdosing and the drugs he was prescribed led to unique visual disabilities that influenced the yellow colors he chose for his 1889 work *Starry Night*. Edouard Manet suffered from a debilitating physical condition called *tabes dorsalis*, syphilis, and phantom pain from an amputation. Edvard Munch, Mark Rothko, and more iconic names are also associated with mental and physical health problems as well as celebrated for their lasting impact on painting. The dynamic and memorable health issues experienced by some of the top painters in history is noteworthy and perhaps influenced why art therapy wasn't integrated seriously into a clinical setting until the late 20th century.

Remarkably, Frida Kahlo, the distinguished feminist self-portraitist of the 20th century began painting after being seriously impaled in a car accident and hospitalized for months. Her painting career stemmed from her use of painting as a means of art therapy while bedridden for a year after her accident. Painting helped her overcome depression and other ailments from her accident, and ultimately led to her famous career. In the contemporary context, scientists, physicians, art therapists, researchers, and scholars are turning to the use of art therapy as a form of improving mental health and enlightening the patient's illness experience.

Current Art Programs Across the United States

A 2004 publication titled *Cultures of Care: A study of Art Programs in U.S. Hospitals* showed that of 2,333 responding hospital establishments in 2004, about 43% of them had instituted some form of art in the healthcare setting. There are a total of 6,090 hospitals in the

United States, meaning over 1/3 of hospitals responded to the study. Of those that had begun to integrate art into their atmospheres, settings, and practices, a 73% majority of what constituted “art” for these hospitals included displays of art such as paintings, murals, and sculptures. A surprising 78% of the 2,333 hospitals that used art also used art therapy programs for “patient motivation... and to create a healing environment,” (State of the Field Report: Arts in Healthcare, 2009). This same paper shows statistics from 2007, which indicate a rise from 43% of Hospitals implementing arts in their establishments, to closer to 45%. Although little research has been done on the prevalence of art programming in hospitals since the early 2000’s, when citing reasons as to why their institution implemented arts programming and visual art on the walls of their buildings, the two most common responses were to benefit patients and to contribute to a healing environment (State of the Field Report: Arts in Healthcare, 2009).

Senior Fellow Blair L. Salder at the Institute for Healthcare Improvement and the past CEO at Rady Children’s Hospital San Diego believes that there are economic benefits that come from turning towards alternative methods of healing, such as art therapy:

“In this new healthcare era of increased transparency, rising consumer expectations, and spiraling costs, we need solutions that improve patient care and at lower costs. As a hospital CEO for 26 years, I witnessed how well designed and effective arts interventions can deliver these benefits. When the arts – music, writing, drawing, dance – are used in hospitals and palliative care settings, pain and anxiety are reduced for patients, which promotes healing and improves their care experience. I am optimistic that promising new research will show these programs will reap the additional benefits of shorter hospital stays, less medication, and fewer complications – potentially saving our healthcare system significant dollars annually” (State of the Field Report: Arts in Healthcare, 2009).

Even in 2009, leaders of hospital organizations were calling for more integration of art therapy programs to medicinal settings, claiming that they would provide economic relief for the hospital, as well as tangible aid to the patient. At another Cancer center, the Feist-Weiller Cancer Center in Shreveport Louisiana, nursing staff found that they were less likely to be called on by patients for miniscule requests when the patient was involved in art projects in their rooms, because the “patients are in a better and happier mood after their painting project,” (State of the Field Report: Arts in Healthcare, 2009). This also points to an added economic benefit for a hospital, less pressure on the nursing staff, and happier moods for patients because of the integration of painting art therapy. Additionally, a hospital is benefitted economically when patients have shorter stays because less resources are used and less money is used for drug expenses.

However, it is still a common theme among healthcare practitioners, and even artists that create works for hospitals, that art additions to hospital walls serve only a happiness benefit. Artist Rachael McCampbell, who in March of 2020 finished a 22 foot long mural on the 11th floor of Vanderbilt’s Monroe Carell Jr. Children’s Hospital, says that she “hope[ed] it’s something that can divert them from their worries and ease their heavy hearts,” (Echegaray, 2020). This epitomizes the thought that art is merely a distraction for the sick and ill, and that it can be nothing more and not create tangible difference in the course of a patient’s illness. I believe opinions like these stem from the lack of quantitative research performed regarding the health benefits and health outcomes of patients with the addition of art therapy programming in conjunction with the use of soothing art on the walls of hospitals, and the difficulties in proving causation not just correlation of art and health.

What Metrics Define the Success of Art Therapy?

To determine if art therapy in the form of studying painted works or painting can be beneficial and successful towards the care of patients in a hospital, it is important to understand what metrics we use to define success as we survey the available data and research studies on this limited-research topic. Unlike when a talented painter, famous artist, or a painter by hobby creates works, the patient who performs art in the means of aiding their health does so not for the consumption of the works by others, but for themselves. Thus, many research studies on the impact of art therapy determine success based on patient interviews, questionnaires, and participant observation. These studies primarily gauge a patient's feelings towards their hospital environment or symptom management after the introduction of art therapy and draw conclusions based on open-ended patient responses. Patient interviews in structured clinical research are common, and often exemplify how "art contributes to creating an environment and atmosphere where patients can feel safe, socialize, maintain a connection to the world outside the hospital, and support their identity," and are used by having patients interact in their clinical setting before the introduction of painted works to the walls and after (Nielsen et. al, 2017). Dr. Arthur Nielsen works as a board certified psychiatrist and Clinical Associate Professor of Psychiatry at Northwestern's Feinberg School of Medicine and brings contemporary thought to integration of art therapy through his current research. A fascinating piece of information from the Nielsen (2017) study, concluded that some participants did not consciously recall or even notice the addition of new artwork to hospital walls, but still had an increase in their levels of satisfaction and emotional well-being compared to being in the same setting but without the paintings on the walls. I believe that interviews are a fine measure of addressing the way art impacts the patients,

but I also believe that additional studies have touched on supplementary measures of tangible success.

Interviews and questionnaires can be reliable but could prove not to be incredibly valid if used as the sole measure of success from an art intervention program on patient outcome. This is because surveys can use leading questions, use language that participants may not be familiar with if it is too scientific, use language that may be above the comprehension level of the participant, have too open-ended form of questions, or not have enough answer options for patients when reporting their experience and outcomes after participating in art therapy.

Other means of determining if art intervention in a hospital can provide benefits to the patient and their experience include physical measures such as blood pressure, cytokine levels, hormone levels, or cortisol levels. A 2015 study conducted at Georgetown University investigated the effects of art therapy on hypertension in a specific subset of the population. This study was aimed at determining if art therapy sessions, predominately painting sessions, could reduce high blood pressure in urban African American women. Blood pressure was used as both the goal and the dependent variable to test if art therapy was an effective addition outside of analgesic prescriptions. The study determined, “a linear regression analysis of the sum of the blood pressure changes in all... participants found a cumulative trend of lower blood pressures as a result of art therapy,” (Mullarkey, 2015). Although this study only included a small number of participants, less than 15, the results were promising, indicting the importance for future clinical researchers to include larger groups and more varied participants, in their studies. I believe that physical measurements of stress levels such as blood pressure and cortisol levels are a good measure at addressing if painting intervention is a success in a medicinal setting. As these numerical values provide more of a quantitative measure of success rather than surveys that

provide more of a qualitative representation of accomplishment and can have leading questions or flaws. Overall, it would be beneficial for researchers to include a number of measures and metrics both qualitative and physical, in order to truly determine how painting and studying paintings can aid healing in a holistic sense.

This paper is a study of many existing pieces of literature and clinical research trials, and many of the studies tended to use interviews, questionnaires, regression analysis, paired t-tests, or other quantitative measures to define the success of art therapy interventions on their patient populations. Again, many quantitative metrics were used to determine the success of an art therapy intervention across these trials, such as blood pressure, direct effects on a patient's recovery, length of stay in a hospital, or cortisol levels.

Viewing Art and its Effects on Health

From my in-depth literature analysis and survey of existing research, I argue that viewing paintings exceeds aesthetic enjoyment for multiple health conditions. Art therapy in the form of studying or observing paintings should become more commonplace in the medicinal setting and incorporated into more hospitals and clinics across the globe. The public conception of a hospital setting is white walls, sterile atmosphere, and a lack of color. However, “today, as scholars increasingly view health holistically, new research has begun to take seriously the role that art can play in the healing process,” states journalist Menachem Wecker for the Washington Post (Wecker, 2019). All over the world, paintings are increasingly becoming a part of healthcare settings, clinics, and hospitals, stressing the important effect that art can have on the patient experience, even beyond creating a docile environment. A research study from 2007 at the University of Aalborg in Copenhagen, Denmark states that “positive effects not only on patient

well-being but also on health outcome such as length of stay in hospital and pain tolerance,” can be experienced from viewing paintings in a clinical setting (Wecker, 2019). This directly contributes to the argument that by observing paintings in a hospital, a patient can have physical positive effects on their experience and outcome, beyond merely a soothing effect.

The entire environment of the hospital can contribute to physical symptom alleviation of patients such as stress levels (cortisol) and blood pressure (Nielsen et al, 2017). Studies from 2009 and 2015 at the Swedish Institute of Architecture have proved that factors surrounding the physical environment of the patient, such as daylight and architecture of the hospital, have a range of documented clinical effects on patients, giving basis that integration of painted works in the medical setting can also influence patients (Frandsen et al, 20019; O’Broin, 2015). Such studies have led to the field of Evidence-Based Design (EBD), which has subsequently set guideline for the integration of art in health care environments, “commissioned with the specific function to contribute to healing,” (Nielsen et al, 2017). These guidelines dictate what type of art can be introduced into the hospital setting. Interestingly, art that is chosen for the walls of hospitals undergoes careful analysis by teams of art curators because viewing art while healthy versus while battling an illness can create very different emotions and impacts.

The head Art Curator for Vanderbilt Medical Center, Jenny Lewis, is in charge of the over 2,500 works of art that adorn Vanderbilt University Medical Center. She stresses “a sick person may view something so differently than a healthy person. A healthy person would see a still-life painting of a table with flowers as something beautiful, and a sick person may see it as flowers brought to a funeral,” (Herbers, 2019). By using feedback from hospital staff, research from other institutions, and patient and visitor feedback, Jenny Lewis has spent the last 30 years calculating out what type of art is best suited for each area of a hospital. According to Lewis,

pediatric patients prefer bright colors, patients just out of surgery desire clear horizons and nothing that can be seen as fuzzy or blurry, and abstract pieces are best suited for communal spaces. Each population has its own needs, and it is very important for faculty in charge of placing art in hospitals to be aware of what art can best aid their patients.

How Painting Impacts A Multitude of Health Conditions

For the patient partaking in art therapy for a certain ailment or disease, it is not the product from their canvas and paints that is aiding their care, “it’s the process,” states Megan Carleton, an art therapist at Harvard Hospital Massachusetts General Hospital (Harvard Health Publishing, Harvard Medical School, 2017). Research also shows that creating visual art reduces stress and promotes relaxation in hospitalized populations. Additional studies “have shown that expressing themselves through art can help people with depression, anxiety, and cancer,” (Harvard Health Publishing, Harvard Medical School, 2017). A survey of many research articles, on varying health conditions as described below, shows how painting can improve a patient’s outcome and illness experience.

A joint study in Montreal, Canada, between the Jewish General Hospital, the RUIS McGill Centre of Excellence on Longevity, and the Montreal Museum of Fine Arts presented conclusions from a 2017 and 2018 clinical study on the effects of painting on elderly patients’ health. The study was conducted over the course of a year and involved more than 150 patients over the age of 65, with ranging diseases and health issues. The clinical study aimed to “quantify and qualify changes in the health status of participants in art workshops,” (Beauchet, 2018). The principal investigator Dr. Oliver Beauchet, professor of Geriatrics at the Sir Mortimer B. David Jewish General Hospital, concluded that “participatory-based art activities, may provide unique

opportunities to enhance the quality of life of individuals living with Alzheimer's disease or other dementias," (Beauchet, 2018). His team's research paper stresses the need for more art therapy interventions across the world and clinical research aimed at quantifying the benefits that patients may reap when they are involved in painting. Ultimately, Dr. Beauchet and his team discovered that the impact of weekly painting sessions with their geriatric population exceeded their hypothesis of slightly improving mood of participants. "The observed health benefits surpassed the expectations of those involved in the study. The results show that participation in a cultural mediation activity such as painting or drawing not only improves well-being and quality of life, but also enhances the health of... people aged 65 and older," (Beauchet, 2018). Because the health benefits seen in this study on elderly populations exceeds emotional support, art therapy proves to be an invaluable tool for improving the overall health of the patients.

The current leading cause of death in the United States is Cardiovascular disease, which is significantly increased by the incidence of diabetes and stress (CDC, 2020). Cardiovascular diseases "are associated with psychosocial difficulties such as depression and chronic stress, contributing to negative cardiovascular outcomes. Engagement with creative activities has the potential to contribute toward reducing stress and depression and can serve as a vehicle for alleviating the burden of chronic disease," says an article published by the NIH in 2010 (Stuckey and Nobel, 2010). Other significant contributions to the yearly death toll in the United States include stroke, diabetes, and Alzheimer's disease, all of which are influenced by stress and emotional mental health. Painting and art therapy can prove to be a beneficial means of not supplementing, but enhancing, care of patients, according to psychologists Heather Stuckey and Jeremy Nobel. This is because of painting's ability to "heal emotional injuries, increase understanding of oneself and others, develop a capacity for self-reflection, reduce symptoms, and

alter behaviors and thinking patterns. Given the ubiquity of creative expression, as well as the relative ease of engagement, the extent to which psychological and physiological effects are sustainably health enhancing is an important area for public health investigation” (Stuckey and Nobel, 2010). These psychologists also mention the relative ease of engagement of art therapy, which is important when contemplating how well art therapy can be integrated into existing medical facilities.

For patients living with severe motor paralysis, many clinicians have been searching for tools to help reestablish communication, participate in creative expression, and mitigate the effects of their severe disabilities. Researcher Claudia Zickler et. al and her team have studied the overlap of modern artificial intelligence technology and art on the effects of patients with severe motor paralysis through a tool called a Brain-Computer Interface. The tool requires no voluntary muscle control and is used in patients with severe disabilities due to motor degeneration or brain damage. The patients have the ability through thought to create paintings on virtual canvases and “it allows users to actively participate in the leisure activities of painting pictures and thereby expressing their verbal creativity and possibly their emotional state in a non-verbal manner,” (Zickler, 2013). This study goes on to prove that this form of virtual painting does help severely motor impaired patients through not only creative engagement, but it also serves as an invaluable tool for communicating with their friends, families, and healthcare providers about their medicinal needs and mental health status. They found that their tool, when promoting research subjects to perform “free painting” with the device, helped the “re-establishment of communication, environmental control and mobility,” (Zickler, 2013). Although not painting in a traditional sense, this form of art therapy helps patients physically bridge parts of their condition that are preventing them from communicating with their health

care providers and loved ones, and could prove itself as a game changing tool for patients struggling with diseases such as Multiple Sclerosis and traumatic brain injury.

A 2010 study in the *Journal of Allergy and Clinical Immunology* tested specifically whether art therapy interventions in a randomized control trial could affect or impact children with asthma. Measurements taken at baseline, throughout the trial, and six months after the final art therapy session used the Formal Elements Art Therapy Scale, Pediatric Quality of Life Asthma Model Scale, and the Beck Youth Inventories. The researchers ultimately concluded that children struggling with asthma receive benefit from art therapy that is defined as decreased anxiety and increased quality of life (Beebe et. al, 2010). Another research study on pediatric asthma and the effects of art therapy actually used the art painted and drawn by the patient to serve as a tool to identify asthma. “Visual arts also serve as a diagnostic tool; asthma symptoms may be revealed in children’s illness drawings,” (Gabriels, Wamboldt, Adams, and McTaggart, 2000). I argue for enhancing Western medicine approaches and drug interventions with art therapy, but contemporary researchers here are using art therapy as a diagnostic tool. This use of painting for diagnostic means is reminiscent of the Rorschach Inkblot test in the 20th century, used to diagnose Schizophrenia and other mental health conditions, and could serve as a modern foundation for future research trials on art as a diagnostic device.

Chrohn’s disease is a form of inflammatory bowel disease in a human’s digestive tract causing abdominal pain, fatigue, severe diarrhea, and malnutrition. For children struggling with Chrohn’s disease, a recent study proved that for an individual child, “art therapy resolved the experiences associated with the child’s traumatic hospital experience and negative feelings regarding the treatment, thus solving the problem of internalization and improving his quality of life,” (Oh et. al, 2021). The biggest flaw in this clinical research trial is that there was only one

subject and no control group to compare the art therapy sessions to, thus outside factors could also lead to the correlation in positive effects the child experienced after art therapy painting sessions for six months. However, the results still show a positive correlation between art therapy and improved treatment for the patient. This illustrates the need for further study in larger groups for Crohn's disease patients.

For patients struggling with kidney failure and in need of constant hemodialysis, the process by which a machine performs the function of the kidneys to clean waste products from blood, therapeutic painting could prove to aid their course of care. At the University of Florida, Gainesville Division of Nephrology, Hypertension, and Transplantation, a clinical research study conducted in 2006 showed that after 6 months of art therapy including painting and crafts, paired baseline measurements of health were improved. Patients showed less weight gain, greater serum carbon dioxide content, greater phosphate levels, and a trend to less depression- all positive signs for patients struggling with kidney malfunction or kidney failure. "Regression analyses showed that high participation correlated with improved SF-36 scores for Social Function (11.1-unit increase; $P = 0.01$), Bodily Pain (7.6-unit increase; $P = 0.04$), and Role-Physical (6.6-unit increase; $P = 0.06$), as well as a trend to greater albumin levels (0.11 g/dL [1.1 g/L]; $P = 0.08$), but with greater phosphate (0.8 mg/dL [0.26 mmol/L]; $P = 0.01$) and lower calcium levels (0.3 mg/dL [0.07 mmol/L]; $P = 0.07$)," concluding that the hospital's new Arts-in-Medicine Program provided tangible benefits to the hemodialysis patients (Ross, Hollen, and Fitzgerald, 2006).

Artistic creation through painting has shown itself as a process that deserves more recognition and research, when combined with medicinal efforts. After diving into the many ways paintings can and have affected not only the patient's illness experience but also functional

improvement, it is important to understand the role of neurology and biology in observing and creating painted works of art for clinical care.

Neurology and Biology of Paintings

The neurobiology behind painting plays a very important role in how studying art or creating art can impact a patient positively and physically. University researchers in the Department of Geriatric Studies at the University of Arizona claim “each time you look at a piece of art, your brain is working to make sense of the visual information it's receiving. From highly lifelike portraits to abstract collections of rectangles, looking at art stimulates the brain and puts our innate knack for organizing patterns and making sense of shapes to use,” (UA Global Campus, 2017). Remarkably, research also shows that when looking at beautiful or perplexing art, the body increases blood flow to the brain by close to 10%. Psychologist Dr. Dacher Keltner from the University of California Berkley claims that viewing beautiful art not only promotes blood flow to pleasure parts of the brain, but also “awe, wonder, and beauty promote healthier levels of cytokines... [which] has a direct influence upon health and life expectancy,” (Phillips, 2005). Cytokines are cells secreted by our immune systems that have varying effects on other cells. They serve as a chemical communicator throughout the body and oftentimes too little or too many can lead to the progression or worsening of a disease. Thus, viewing art can help keep our immune systems in balance by promoting healthier levels of cytokines.

Biologically speaking, observing paintings has an impact on emotion, hormones, and other anatomical systems, including the immune system. A 2015 health report in The Telegraph from researchers at the University of California in Berkeley, details the healing power of observing art and creative works, including the preventative effects of paintings. The Berkeley Researchers,

including Dr. Jennifer Stellar in the Department of Psychology claims “great nature and art boost the immune system by lowering levels of chemicals that cause inflammation that can trigger diabetes, heart attacks and other illnesses,” (Byrne, 2015). A study performed by the same research team took samples of oral mucosal transudate from patients on days where they observed art and days where they had not and compared the levels of cytokine interleukin 6, a common marker of inflammation and poor health. They found that on the days where the over 200 research subjects had observed paintings, these had the lowest levels of the cytokine interleukin 6. In fact, having higher levels of cytokines are often linked with diseases such as COVID-19, depression, type-2 diabetes, arthritis, Alzheimer’s disease, and heart disease. Thus, viewing art promoted normal levels of cytokines in the body, and contributed to healthier individuals.

Canadian physician Dr. Helene Boyer, in conjunction with promoting art therapy in patients with diabetes and chronic illnesses articulates in a 2018 article that “ ‘we secrete hormones when we visit a museum and these hormones are responsible for our well-being... the increased cortisol and serotonin from looking at art is similar to the effect of exercise’ ” on health (Cascone, 2018). Many clinicians have considered viewing paintings as an alternative to exercise for patients who are physically unable to exercise, who are elderly, or who are injured. This influx of positive hormones on patients participating in art therapy also effects mental health conditions, not solely diabetes or chronic illnesses.

The cognitive effects of making art are numerous, and can be clearly demonstrated through drawing and painting. Art therapist Megan Carleton at Harvard University affiliated Massachusetts General Hospital states in a published article through Harvard Medical School in 2017 that “drawing and painting stimulates memories in people with dementia and enabled them to

reconnect with the world. [But] People with dementia aren't the only beneficiaries. Studies have shown that expressing themselves through art can help people with depression, anxiety, or cancer, too. And doing so has been linked to improved memory, reasoning, and resilience in healthy older people," (Harvard Health Publishing, Harvard Medical School, 2017). The improvements in memory seen from the process of painting stem from the neurobiological impact of physically painting on a patient's brain. Author and neuroscientist Eric Jensen, in his book *Arts with the Brain in Mind*, states that painting nourishes integrated and trans-disciplinary parts of the brain, including sensory lobes, attentional regions, cognition, emotion, and motor capacities (Phillips, 2015). Since painting can prove to be a healthy alternative to brain stimulation than other modes of extracurricular activities or the lack thereof, and resources for painting are simple to introduce to a medical setting, I argue that painting should be incorporated into more medicinal settings alongside western medicine approaches.

Art Therapy's Effects on Alzheimer's Disease

Many hospitals around the country are beginning to exhibit art on their walls, in their consultation rooms, lobbies, waiting areas, delivery rooms, PICU units, and more. Several varied studies and clinical research trials have proved that viewing art can be beneficial for a multitude of different illnesses, diseases, and conditions. Specifically, there exists research papers and clinical trials that point to art therapy having a positive effect on Alzheimer's Disease. Research by the Fisher Center for Alzheimer's Research Foundation shows the process of painting or appreciating painted works can be applied to patients battling Alzheimer's Disease. Alzheimer's Disease is a neurological disorder that is related to atrophy of brain cells. Common clinical and observed symptoms include dementia, confusion, behavioral and social skills decline, and

memory impairment. Drugs and rehabilitation can commonly slow the symptom development of Alzheimer's by boosting chemical performance of neurotransmitters in the brain, however there is currently no cure for the progression of the disease. "Although studies on art's effects on the brain are limited, research suggests that artistic engagement may help to ease common behavioral symptoms of dementia like anxiety, agitation, and depression.,, and possibly help stimulate memory," according to research being carried out by the American Art Therapy association (Chancellor et al, 2014). This is why regular art therapy interventions could prove beneficial for the care of Alzheimer's patients in a clinical setting. According to Neuroscientist Bree Chancellor, working in conjunction with the Fisher Center for Alzheimer's Research Foundation: "In another study of 45 people in Britain with mild to moderate dementia, those who engaged in art making once a week for 40 weeks showed improvements in physical abilities, became more social and were calmer compared to a group that did recreational activities," providing more evidence that art therapy is a viable intervention with a meaningful impact on a patient that reaches beyond artistic expression and cultivating creativity (Chancellor et. al, 2014).

There are also programs across the United States and Europe that offer Alzheimer's patients the opportunity to go on small 90-minute tours of the art in a museum's collection, including NY MoMA, the Frye Art Museum in Seattle, the Carnegie Museum of Art in Pittsburg, and the Walker Art Center in Minneapolis. The Meet Me at MoMA programming specifically has provided groundbreaking quantitative and qualitative research that points out many benefits that arise from making art-viewing accessible to people with Alzheimer's Disease. Among the cited benefits that viewing and understanding paintings provided patients, positive social engagement, decreased depression and anxiety, and stimulation are at the top of the list. NY MoMA's research team says that art is a good addition to Western medicine when it comes to

Alzheimer's patients and others struggling with dementia because "the ability to make art, and certainly the ability to look at art, is relatively preserved in those with Alzheimer's disease. Deficits like impaired memory, learning and language are typically not impediments to making art, especially in the early to moderate stages of the illness," (Chancellor et al, 2014). This means that patients with dementia are able to still use parts of their brains that are somewhat intact, and they have the ability to strengthen specific synapses, which may lead to long term memory creation (Nicoll et al, 2013).

Outside of museums and hospital collaborations, more groups including geriatric centers and assisted living facilities are welcoming the integration of viewing art and painting for their elderly patients with Alzheimer's. A research group through an assisted living facility focused on Alzheimer's in Florida has its residents participate in painting classes weekly. They claim that their elderly participants often express relieved stress, expanded creativity, memory enhancement, problem-solving and motor skill enhancement, and emotional growth from these sessions (Brandon, 2019). All of these studies illustrate the positive effects on Alzheimer's patients, while not actively healing the disease, can help aid medicinal efforts to slow the progression of symptoms and ultimately extend the life of a patient.

Art Therapy's Effects on Stroke Patients

There has also been qualitative research conducted on stroke patients who have above-average hospital stays and significant impairments in cognition, speech, function, or language and the impact of art therapy on their condition. Studies show that the mental health impact of participating in creation of paintings with one-on-one art therapists in the hospital after experiencing a stroke can diminish depression by between 24 and 40% in patients (Baumann,

2012). Additionally, anxiety is also similarly diminished by close to 22% in stroke patients by comparing surveys before and after art therapy. Experiencing a stroke itself, and the hospital stay that is required because of the physical and mental aftermath, can in general lead to a “myriad of negative emotional consequences including severe shock, distress, humiliation, disorientation, fear, frustration, loneliness, and boredom,” (Baumann, 2012). Importantly, Dr. Baumann’s, from the University of Pittsburg, research shows that rehabilitation after a stroke is complex and that “rehabilitation is adversely affected by post-stroke depression and/or emotional distress,” therefore painting’s impact on depression, distress, anxiety, and the emotional state of the patient can aid their physical and neurological recovery after a stroke or in part set up a healthy mental foundation for the patient to move forward from (Baumann, 2012).

An important conclusion can be found within Baumann’s research: “the multi-disciplinary stroke team considered that in addition to potentially affecting mental or emotional well-being, such a program had the potential to make a positive impact on functional recovery by way of improving patients’ motivation to engage in rehabilitation and through this, reduce the length of hospital stay for some patients,” (Baumann, 2012). Reduced lengths of stay for patients would also impact their return to normalcy, their healthcare journey, and would be of benefit to physicians and hospital administrators. Lastly, research by this same team concludes that “the most commonly reported benefits relating to the use of arts in health contexts included reduced need for medicine (typically analgesics),” (Baumann, 2012). This key piece of evidence from the application of art therapy in a clinical setting emphasizes the possible decreased need for drug intervention in patients, and the importance of making painting art therapy readily available to stroke patients. This research by Dr. Baumann and his team conclude that drug intervention and length of stay in a hospital are both lessened when art therapy is introduced, giving basis to the

argument that art therapy is more than a “feel-good” exercise, and actually contributes tangibly to a patient’s course of care.

Art Therapy’s Effects on Cancer Patients

Art therapy has also been shown to impact cancer patients’ pain management, depression levels, fatigue, and more. A 2003 study on a cohort of 30 women, using interviews as a measure of success, analyzed how the integration of painting alongside their medicine contributed to their prognosis of cancer or other chronic illness. The study determined that these women used art to enable the expression of grief and emotionally deal with their diagnoses. “Art was more than cathartic. It offered a versatile means of overcoming the restrictions imposed by illness on self and lifestyle, in many cases creating a more enriched lifestyle than before,” said the researchers Dr. Frances Reynolds and Dr. Sarah Prior of Michigan State University Department of Sociology (Reynolds and Prior, 2003). Because of the enriched lifestyle the patients experienced, art therapy was working through biosocial mechanisms to impact the patient’s emotions, mental health, social coping, and ultimately the physical restrictions placed on them from their illness experience.

Another study on the influence of art therapy on cancer patients performed in 2006 at Northwestern Memorial Hospital in Chicago found that after 1-hour art therapy painting sessions, cancer patients experienced more control of their cancer symptoms and coping habits. The research study had 50 participants and used the Edmonton Symptom Assessment Scale (ESAS), which measures nine symptoms in cancer patients: pain, tiredness, nausea, depression, anxiety, drowsiness, appetite, wellbeing, and shortness of breath. They also used the Spielberger State-Trait Anxiety Index (STAI-S), which is used to diagnose anxiety that is different from

anxiety produced by depression. “There were statistically significant reductions in eight of nine symptoms measured by the ESAS, including the global distress score, as well as significant differences in most of the domains measured by the STAI-S. Subjects overwhelmingly expressed comfort with the process and desire to continue with therapy,” (Nainis et. al, 2006). The participants want to continue with art therapy in conjunction with their medicinal care also suggests the importance of integrating art therapy in a holistic medicine approach.

The 2009 Study of the Field of Arts in Healthcare states that “research with children with cancer indicates that engaging in drawing and painting is an effective method for dealing with pain and other disturbing symptoms of illness and treatment,” (Rollins, 2005). This conclusion shows that art therapy, specifically in regard to the cancer patient populations studied by Rollins and her team, has the ability to improve symptoms and aid pain and is not solely for creative expression. Pediatric cancer populations are experiencing art therapy as a potent means for dealing with symptom and pain management. This goes beyond emotional expression for this population of patients and proves art therapy can be a compelling method of intervention or aid.

Cancer patients continually struggle with depression and fatigue from their chemotherapy sessions for the treatment of their various cancers. In 2007, researchers Bar-Sela and Atid et. al studied art therapy’s impact on cancer patient’s experiencing either depression or fatigue. They ultimately concluded that art therapy is “worthy of further study in the treatment of cancer patients with depression or fatigue during chemotherapy treatment” because art therapy was able to reduce levels of both of these in their clinical population of cancer patients (Bar-Sela, Atid, et. al, 2007). Art therapy’s impact on depression and fatigue, which are very common symptoms associated with cancers, could prove invaluable with cancer patients, indicating the need for further research into art therapy’s beneficial treatment use for these patients.

The Cutting-edge Initiatives by the Montreal Museum of Fine Arts

In 2018 in Quebec, Canada the Montreal Museum of Fine Arts (MMFA) and members of the Médecins francophones du Canada Medical Association (MFC) combined efforts to bring a holistic art therapeutic approach to clinical care. Physicians that are members of this French-Canadian Medical Association can physically prescribe museum visits to their patients of various ailments and diseases. This 2018 initiative is the first of its kind in the world, and it is significantly bridging the worlds between medicine and museums. Vice President of MFC and a family medicine physician Dr. Helen Boyer claims that “people tend to think this [art] is only good for mental-health issues... But that’s not the case. It’s good for patients with diabetes, patients in palliative care, [and] for people with chronic illness,” (Cascone, 2018). The art institute itself is conducting more than “10 art and health-related clinical trials, studying the effects of art on patients suffering from conditions such as eating disorders, breast cancer, epilepsy, mental illness, and Alzheimer’s disease,” (Cascone, 2018). The museum and its healthcare partners passion in the newly popular intersection between art and medicine is exemplified in the 10 research trials that have been undertaken in the last two years. The results of these trials could solidify impact that painting and art viewing have on the health outcomes of patients of various illnesses. The Montreal Museum of Fine Arts and its physician supporters believe that art therapy is “on the cutting edge, with such treatment soon to become widely accepted medical practice,” (Cascone, 2018). The physicians, art curators, and museum historians in Montreal participating in this cutting-edge initiative also state that patients with chronic illnesses who visit doctor-prescribed art viewings at museums have a “release in hormones... that is otherwise difficult to attain for those with chronic pain who have trouble

maintaining regular physical activity. The Museum visits complement, don't supplement, more traditional treatment," (Henry, 2018). The museum's promotion of art therapy is meant as an aid to analgesics, surgery, and other forms of interventional symptom management and disease treatments, and it is believed to enhance the healthcare that a patient is provided.

The Montreal Museum of Fine Arts has coined the term *muesotherapy*, for what they believe is the positive impact on wellness and physical and mental health from museum visits for patients struggling with conditions such as eating disorders, cancers, chronic illnesses, and Alzheimer's. Impactful projects that the MMFA and the Michel de la Cheneliere International Atelier for Education and Art Therapy have instituted since 2018 also include exhibition visits in the company of educators and health professionals, participation in creative painting workshops, and presentation of works by patients to the public. The MMFA itself has even founded an art therapy studio within the museum, a medical consultation room, and an Art Hive. The Art Hive functions as a free creative space for meeting people, sharing ideas, and participating in group art therapy projects. The idea of Art Hives is widespread across the globe, and often they pop-up in local libraries, community centers, homes for the elderly, and hospitals, with a function of fostering open dialogues between patients and providers, pain management, and creative expression.

The Art therapy programs found at MMFA, which are leading the way in engaging in art as a piece of the holistic approach to medicine, are focused on a few subgroups of patients. One of the art therapy programs, which includes viewing the art in the museum and creative painting workshops, is centered on people with eating disorders- namely anorexia and bulimia. The MMFA states that their program allows people "in the safe and affirmative setting of the Museum, [to] break through their isolation, develop a feeling of belonging within their

community, and build a positive body image,” (Montreal Museum of Fine Arts, 2018). By building a more positive body image and being surrounded by a support system, the people struggling with these eating disorders can begin to break down the complex causes of eating disorders through art therapy. Researcher Eric Stice, in his Meta-Analytic Review from 2002, states that body image and body dissatisfaction are the leading contributor of eating disorders:

“A negative body image, on the other hand, involves a distorted perception for one’s shape. Negative body image (or body dissatisfaction) involves feelings of shame, anxiety, and self-consciousness. People who experience high levels of body dissatisfaction feel their bodies are flawed in comparison to others, and these folks are more likely to suffer from feelings of depression, isolation, low self-esteem, and eating disorders. While there is no single cause of eating disorders, research indicates that body dissatisfaction is the best-known contributor to the development of anorexia nervosa and bulimia nervosa,” (Stice, 2002).

Because of the ability of art therapy to aid people with body image dysmorphia, it is a tool that should be integrated into clinics, hospitals, and other medical facilities that treat eating disorder patients. Building more positive body images for these patients helps them socially adjust and speaks to the biosocial abilities of art therapy intervention. The MMFA’s art interventions have the ability to help struggling patients or even prevent eating disorders among participants.

Another population that the MMFA’s programs serve are geared towards and include elderly community members with a myriad of health concerns. In a randomized clinical trial conducted by health researchers and leaders at the MMFA, elderly museum-goers attended the weekly programming “Thursdays at the Museum,” which aims to improve physical and mental health of older community dwellers. The 2020 clinical research trial compared 150 older adults,

half of which attended the art therapy and art viewing sessions, and half of which did not. The study ran over 3 months and assessed the elderly individual's well-being, quality of life, frailty, heart rates, daily step counts, sleep durations, and sleep cycles at six spread out intervals. This study was one of the leading clinical research projects to show for the first time that participatory art-based activities on older community members could act positively on the physical health condition of the participants, not solely their emotional well-being. "This study introduced the prospect of using art-based activities for health prevention in aging populations at risk for adverse health events," (Beauchet, 2020). This research trial ultimately determined that it is possible to improve the health status of elderly individuals through participatory and visual-based art interventions.

Personal Narratives on Art Therapy Impact

Art therapy in the form of painting and viewing paintings has impacted millions of patients across the globe and their stories attest to why art therapy should be integrated as a commonplace tool in medicinal settings to amplify healthcare. At Children's Hospital of Dartmouth, ArtCare Volunteer Kristen Belano spoke of her creative, art-based interactions with a little girl struggling from pediatric cancer as life-changing and a tool to aid her pain-management. "Losing herself in her artwork, Olive is able to drown her pain as paint kisses page and a sweet sense of freedom surfaces from the fibers of the paper. She breathes this in fiercely and perseveres, as her hours long chemo Thursdays fade into each other. With each session, this little girl unknowingly proceeds to brighten the entire room. There is a beautiful healing process in motion here," (Americans for the Arts, 2004). With the addition of painting to the child's

treatment, she was able to express lower levels of pain to her healthcare providers and foster a lessening of symptoms.

For artists themselves dealing with physical or mental illnesses, their art can become more than relaxing or more than a way to emotionally express themselves. Their art, and specifically paintings, can lead to tangible mental health differences. One artist at the Healing Power of Art online exhibition in 2015 spoke of his art as more than just an outlet, but as a source of pain management and depression alleviation. “During chemo therapy, for a bone marrow transplant... within the last ten years painting has been a continuous remedy for the depression and pain,” (Phillips, 2015). For this physically ill artist, painting became not only an outlet for stress management and creative expression, but also aided his chemotherapy treatment by promoting hormone balance and mental health benefits.

I was also drawn to the impact of art therapy on patient coping and healing because of my own familial experience, as well as a history of art minor and the opportunity to volunteer with pediatric patients alongside an art therapist, an opportunity which was sadly halted because of the onset of COVID-19 in the United States in March of 2020. My personal experience with art therapy comes from my interactions as a child with my grandfather, who sadly passed away from Alzheimer’s disease in 2007. As his disease rapidly progressed, all while I was under eight years old, his communication abilities and mobility wavered and my family was barely able to understand him. However, whenever I would come visit my grandparents’ home we would always draw and partake in crafts together. Miraculously, these art sessions were the only time my grandpa was able to communicate with anyone in my family how he felt and what he was thinking about. They were little hours of the past, and my grandma was able to see the man that he once was reemerge, through art with his granddaughter. Since I was fairly young, these

painting and drawing times occupy most of my memories of my grandpa. All the while I was not aware that he was sick, because he would seem himself again in these instances.

Theories Through Biosocial Mechanisms on why Art Therapy has a Beneficial Impact

Although more research absolutely needs to be conducted regarding participation in painting as therapy and viewing art in medicinal settings, art therapy has been shown to improve patient's outcomes through the limited research, especially when viewed in a biosocial context. Art therapy for patients is more than a social experiment, but it does play on the social needs of human beings, and in effect helps heal the physical and biological origin of symptoms from diseases. "Art-based activities help patients, regardless of their disease, to build a sense of self, transforming the illness experience into a positive experience and improving patients' well-being and quality of life," (Beauchet et. al, 2020). A biosocial approach to why art therapy interventions can aid healthcare providers in their mission to relieve symptoms, heal illnesses, and guide patients through aging and chronic illnesses, and explains how biological forces and social phenomena blur the lines between inside the body and outside the body. A biosocial approach can be defined by researchers McDade and Harris as "a transdisciplinary approach to understanding human development, behavior, and health," and it helps us understand why art has impacts on conditions that can be considered to have a more social basis, such as an eating disorder (McDade and Harris, 2018). We have viewed why painting has a neurobiological framework for improving patient diseases, but the biosocial theory shows us how art has the capability to transform how the patient views their illness experience, their own body, and their ability to fight a disease- which in turn, leads to better patient outcome.

Painting and viewing art are common tools human beings use to maintain their well-being, even preemptively before a condition or illness is present. Those who interact with art have higher satisfaction with their condition of existence and report better quality of life. A biosocial approach leads scientists to the conclusion that a better quality of life, social phenomenon including viewing art, and the process of creating art, is correlated with countless physical health benefits (Beauchet, 2020). The physical benefits can include “a decreased risk for disease, speedier disease recovery, and increased longevity. In parallel, it has been found that art-based activities are positively associated with numerous aspects of individuals’ physical health, like a better immune system response and slower disease progression, with these effects being related to well-being improvement,” (Beauchet, 2020). A biosocial approach to health and art therapy allows social science concepts such as human interactions and introspection, through art, to be studied as determinates of human biology and health.

When approaching art therapy intervention in medicinal settings with a biosocial mindset, scientists, healthcare providers, and researchers can integrate this increasingly sophisticated tool into commonplace medical interventions. These providers can realize that art has the ability to bridge the neurobiological side of medicine by aiding brain-based problems, and the social side of medicine by improving mental health, decreasing depression and anxiety, influencing healthy community social interactions, and improving well-being across diverse patient populations.

The World Health Organization (WHO) defines health in a holistic manner and echoes the importance of physical health balanced by mental and social well-being (Stuckey, 2010). Researcher Dr. Heather Stuckey in the Department of General Internal Medicine at Penn State University states that “there is evidence that engagement with artistic activities, either as an observer of the creative efforts of others or as an initiator of one's own creative efforts, can

enhance one's moods, emotions, and other psychological states as well as have a salient impact on important physiological parameters,” (Stuckey, 2010). Her research indicates how art therapy provides solid foundations in mental health and social connections, which leads to lasting physical health benefits.

Additionally, many art-based therapies are performed in group settings with many patients engaging in the art therapy concurrently. This adds to the social experience in this creative process, allowing participants to be socially stimulated and experience positive engagement, as well as observe others works. The Montreal Museum of Fine Art, as mentioned previously, states that their “program helped to create a much broader approach to health promotion with a strong community focus,” (Beauchet, 2020). These community ties in turn, are shown to help patients with dementias, such as Alzheimer’s, and promote slower symptom progression. Feelings of social well-being and attachments to communities are extremely important as well for preventative health and any socially stimulated illnesses like eating disorders and mental health conditions. Similarly, when a patient views a painting, they are contemplating human emotions, tying in their own life experiences with the painting, letting their brain decipher the physical aspects of the work, and socially discussing and understanding the works with their art therapist or peers. Art therapy in this way becomes a social phenomenon, with effects on biological conditions.

Rethinking Medicinal Approaches

Important research has been conducted in the first fifth of the twenty-first century regarding the implications of integrating art therapy, in the form of painting and studying painted works, on patient recovery and health experience. However, there are many more questions

about art therapy that need to be addressed by future clinical researchers, such as “whether certain art-based therapies are more or less effective than others, whether the impact of therapy can be tied to other important variables and preconditions, and whether health benefits are sustained or short term,” (Stuckey and Nobel, 2010). The healing process for patients differs based on a multitude, if not innumerable, differences that lie between patients and their specific health issue that they are battling. Research, such as the imaginative research of the MMFA and the MFC in 2018, has shown that many different mental health diseases and even physical illnesses have produced both qualitative and quantitative measures of improvement in conditions after the introduction of painting or studying painted works. Art therapy has begun to be embraced by many countries and countless cultures across the globe, however, “only in recent years have systemic and controlled studies examined the therapeutic effects and benefits of the arts and healing,” (Stuckey and Nobel, 2010). This is why my paper stresses the need for future, continued contemporary research.

Western Medicine is the term used to describe the mainstream system and approach to patient care in the Western Hemisphere, which mainly focuses on treating symptoms and diseases using drugs, radiation, or surgery. What twenty-first century physicians, scientists, and health professionals are realizing is that this modern Western Medicine approach often uses treatments to deal with pain brought on by diseases and overlooks the core illness that is plaguing a patient. In 2003, a symposium hosted by the National Endowment of the Arts (NEA) and the Society of Arts in Healthcare brought together leading experts in the medical field, the arts, social media, business, and government, to develop plans to advance cultural programming in healthcare. The aim was to help raise awareness of the benefits of the arts in healthcare. In 2009, the follow-up 2009 Arts in Healthcare report by the Arts and Health Alliance, spearheaded

by researcher Dr. Judy Rollins, the Assistant Professor in the Department of Family Medicine and Pediatrics at Georgetown University School of Medicine, reports that “today’s renewed focus on humanistic care is leading to resurgence in the knowledge and practice of incorporating the arts into healthcare services,” (State of the Field Report, Arts in Healthcare, 2009). New concepts have begun to emerge that urge health professions to treat patients holistically or humanistically, not just with pain management or symptom alleviation. This is where integration of art therapy in clinical or medicinal settings can play a contemporary role, to help aid a patient’s course of care in a multitude of ways. As we have seen in the many research projects above, art therapy has many benefits: mental health benefits, lowering blood pressure, lowering cortisol levels, releasing stimulating hormones when exercise is not possible, and more. These benefits also span many different diseases and conditions, as discussed in this paper.

Art therapy has been used to bridge emotional problems in patients, however, scattered research on small populations shows that painting has a neurobiological impact and studying painted works a biosocial impact. Even the use of the word *therapy*, which means intended to relieve or heal a disorder, shows that art is on the right track to aid patient care and illnesses alongside analgesics and other interventions. I believe that painting integration into clinical atmospheres, hospitals, hospice centers, and other medical settings, can help create a form of complementary medicine that is holistic, encompasses the whole body, and provides relief that aids a patient’s road to recovery.

Medicine is also taking on new tools so that many patients and people are experiencing what is called preventative care, and art can prove beneficial in this avenue because of its neurobiological impact, biosocial impact, mental health benefits, and physical health improvements discussed in the paper. Using painting and presenting works on the walls of

medicinal settings, not just for the purpose to alleviate pain, but to help preemptively strengthen the mental and physical health of the patient can only aid physicians and other healthcare workers in their role as healers. Painting has also been shown as a possible preventative mechanism for diseases such as dementia, and other conditions that commonly effect elderly populations and are associated with aging (Harvard health Publishing, Harvard medical School, 2017). Instituting painting and paintings in healthcare settings is also easy with the proper supplies and resources and a few dedicated professionals per healthcare setting. Many hospitals and clinics have already undergone transitioning art into their healthcare settings, such as Vanderbilt University Medical Center which has over 2,500 pieces of art, and can thus can be used as a model around the world. According to gerontologist Dr. Thomas R. Cole of University of Florida's Health Humanities Center, "the arts are now being used within healthcare institutions worldwide. The international arts in medicine movement represents a rediscovery of the links between body, mind and spirit and of the unity between the creative and medical arts. It recognizes and advocates the role of the imagination and creativity in developing and maintaining health," (HSCL Wellness: Health Humanities, 2020). Art therapy, in the form of patients participating in painting and observing painted works, has been shown, through limited but confident research, to impact a patient's illness experience and road to recovery in an encouraging manner.

Conclusion

Many of the scientists, physicians, and researchers involved in the literature and research surveyed for this paper concluded positive outcomes for their patients involved with art therapy, but just as importantly they stressed a need for continued research in the future. As mentioned at

the beginning of this paper, limited research exists on the intersection of viewing art or painting and medicinal outcome. An overwhelming amount of the existing research has flaws, including a small sample population less than 50 persons, basis on only the emotional effect on patients after having participated in art therapy, very short study periods spanning only weeks or a few months, or too qualitative analysis on patient outcomes. Other studies outcomes have been limited because of conclusions based on leading questions provided in questionnaires. Literature is hard to find that dives into the cognitive development and effect on patients that contributes to their symptom control and physical improvement. Optimal research for the future would include important factors such as controlled populations of patients with the same condition and a study of arts effects on more diseases than were covered in this paper. Studies should include more than 100 persons, use quantitative measures of success, and be understanding of cultural, ethnic, and racial differences between patients that could affect their experience with art and health care providers. Specific questions that arose throughout this paper were aimed at determining if art therapy could aid patients of a multitude of diseases beyond just emotional reflection or creative engagement, so future research should use quantitative measures such as blood pressure, cortisol levels, cytokine levels, hormone levels, and lengths of stay in the hospital- all of which were quantitative measures used by the successful literature cited in this paper. Additionally, patient reported symptom management and pain relief could also serve as powerful tools for measuring success of future clinical research trials.

Throughout my survey of existing data, research, and literature, questions arose regarding which groups of conditions would art therapy benefit best: mental health disorders, eating disorders, cancers, chronic illnesses, ageing, or dementias and brain-based diseases? Future research groups should explore the benefits of art therapy on different conditions or compare

findings across diseases to see where intervention is best applied. Research can even be used preemptively to determine art therapy's preventative effects on health conditions, which is a great way to usher in more holistic medicine in the US and beyond. Another question that resulted from my research considered how a patient's cultural background and comfort with the art therapist and physician team would affect the impact that art therapy could have on their condition. This should be importantly considered when researchers are setting controls for their clinical trials because different cultures and ethnic groups may approach art with different expectations, emotions, and hopes. Future research should address this question of cultural effect by having patients of a similar condition, say the elderly with no underlying disease, participate in viewing art and see the effects that culture plays on health. Understanding the importance of cultural barriers on medicinal interventions can be further complimented by including art therapy studies in undergraduate and postgraduate medical curriculum for aspiring physicians, nurses, researchers, and sociologists. This would also help open the minds of healthcare workers to holistic medicinal approaches and the added impact of art therapy on patient care.

I conclude that art therapy in the form of painting and observing paintings does more for the patient than emotional aid or creative release, but rather it tangibly aids patient care. My hope is that this paper served as a foundation for inspiration and continued investigation into the powerful cognitive and biosocial effects that art therapy can have on patients of a myriad of conditions.

Bibliography

Advolodkina, Polina. "House." *In House, Emory University School of Medicine*, 3 May 2018, in-housestaff.org/klimt-modernism-arts-relationship-medicine-739.

Altman, Julie. "Margaret Naumburg." *Jewish Women: A Comprehensive Historical Encyclopedia*. 27 February 2009. Jewish Women's Archive. (Viewed on April 19, 2021) <<https://jwa.org/encyclopedia/article/naumburg-margaret>>.

American Art Therapy Association. (n.d.). *History and background*. Retrieved from <http://www.americanarttherapyassociation.org/aata-history-background.html>

American Art Therapy Association. (2013). *What is art therapy?* Retrieved from <http://www.arttherapy.org/upload/whatisarttherapy.pdf>

Aronow, E., & Reznikoff, M. (1976). *Rorschach content interpretation*. New York: Grune & Stratton.

Art Therapy Credentials Board. (n.d.). *About the credentials*. Retrieved from <http://www.atcb.org/Public/AboutTheCredentials>

Arts therapies. (2014, September 27). Retrieved from

http://www.mentalhealthcare.org.uk/arts_therapies

Baum M. (2004). The Healing Environment: Without and Within. *Journal of the Royal Society of Medicine*, 97(3), 145–146.

Baumann, Matt. Peck, Simon. Collins, Carrie. Eades, Guy. (2012). The meaning and value of taking part in a person-centred arts programme to hospital-based stroke patients: findings from a qualitative study. *Disability and Rehabilitation*. Taylor and Francis Online. Vol, 35, 2013.

Bar-Sela G, Atid L, Danos S, Gabay N, Epelbaum R. Art therapy improved depression and influenced fatigue levels in cancer patients on chemotherapy. *Psychooncology*. 2007 Nov;16(11):980-4. doi: 10.1002/pon.1175. PMID: 17351987.

Beauchet, Olivier, Liam Cooper-Brown, Yoko Hayashi, Kevin Galery, Christine Vilcoq, and Thomas Bastien. “Effects of ‘Thursdays at the Museum’ at the Montreal Museum of Fine Arts on the Mental and Physical Health of Older Community Dwellers: The Art-Health Randomized Clinical Trial Protocol.” *Trials* 21, no. 1 (2020): 709–709.

Beauchet, Oliver. *Effect of Art Museum Activity Program for the Elderly on Health: A Pilot Observational Study*. McGill University, Jewish General Hospital Foundation, Montreal

Museum of Fine Arts., Sept. 2018,

drive.google.com/file/d/1loITLJDcVNJ0kKzYvJcTHHzSMk4Gpptj/view.

Beebe, A. Gelfand, E. Bender, B. (2010). A randomized trial to test the effectiveness of art

therapy for children with asthma. *Journal of Allergy and Clinical Immunology*. Volume

126, Issue, 2.

Bogousslavsky J, Tatu L: Édouard Manet's Tabes Dorsalis: From Painful Ataxia to Phantom

Limb. *Eur Neurol* 2016;76:75-84. doi: 10.1159/000447260

Bornstein, R. F. (1996). Construct validity of the Rorschach Oral Dependency Scale: 1967–

1995. *Psychological Assessment*, 8, 200–205.

Bornstein, R. F., Hilsenroth, M. J., & Padawer, J. R. (2000). Interpersonal dependency and

personality pathology: Variations in Rorschach Oral Dependency scores across Axis II

disorders. *Journal of Personality Assessment*, 75, 478–491.

Brandon, T. (2019). The benefits of painting for brain and mental health. Assisted Living Facility

Tessera Living.

Briere, J. (2018). MMFa-MFdC Museum Prescriptions: Museum visits prescribed by Doctors.

Montreal Museum of Fine Arts.

Byrne, L. (2015). Art does heal: scientists say appreciating creative works can fight off disease.

The Telegraph. La Trobe University Arts and Health.

Cascone, Sarah. "Blues Period? Doctors in Montreal Will Now Prescribe Visits to the Museum

as Treatment for All Kinds of Ailments." *Artnet News*, Art World, 23 Oct. 2018,

news.artnet.com/art-world/doctor-museum-visits-treatment-1377736.

Cano, C. (2019). Moving away from society's dependence on contemporary medicine. The

Berkely Beacon. Emerson College.

Carleton, M. (2017). The healing power of art. *Harvard Health Publishing*. Harvard medical

School.

CBC News. (2018). Doctors to prescribe museum visits to help patients 'escape from their own

pain'. CBC News.

CDC. (2021). Leading Causes of Death, Data for the U.S. Centers for Disease Control and

Prevention. U.S. Department of Health & Human Services. USA.gov.

Center for Health and Healing. (2011). Art therapy – history and philosophy. Retrieved from

http://www.healthandhealingny.org/complement/art_history.asp

Chancellor, Bree. American Art Therapy Association. Art Therapy for Alzheimer's Disease and Other Dementia." *Journal of Alzheimer's Disease*, Vol. 39, 2014.

Cole, T. Medical Humanities: an introduction. *HSCL Wellness: Health Humanities, UF Health Sciences*. Cambridge University Press.

Echegaray, C. (2020). Artist hopes mural brightens days at Children's Hospital. *VUMC Reporter*. Vanderbilt University Medical Center.

Fisher Center for Alzheimer's Research Foundation. 2014. How art can aid people with Alzheimer's.

Frandsen A. K., Ryhl C., Folmer M. B., Fich L. B., Øien T. B., Sørensen N. L., Mullins M. *Helende arkitektur*. Institute of Architecture of Design Skriftserie; 2009.

Meet Me. 2018. The MoMA Alzheimer's Project: Making Art Accessible to People with Dementia. New York University. The Museum of Modern Art.

Gomez-Aldana, A. (2018). Doctors, patients sing art therapy's praises. So why isn't there more support? *Side Effects Public Media*. WILL Newsletters of University of Illinois.

Greene, J., Cohen, D., Siskowski, C., & Toyinbo, P. (2017). The relationship between family caregiving and the mental health of emerging young adult caregivers. *The Journal of Behavioral Health Services & Research*, 44(4), 551-5663. doi: 10.1007/s11414-016-9526-7

Herbers, K. (October 10, 2019). "VUMC has 2,500 pieces of art. Jenny Lewis Knows them all".

VUMC Voice. Vanderbilt University Medical Center.

Maranzani, B. (2021). How a Horrific Bus Accident Changed Frida Kahlo's Life.

Biography.Com. A&E Television Networks, LLC.

McDade, T. W., & Harris, K. M. (2018). The Biosocial Approach to Human Development,

Behavior, and Health Across the Life Course. *The Russell Sage Foundation journal of the*

R6=s/social sciences : RSF, 4(4), 2–26. <https://doi.org/10.7758/RSF.2018.4.4.01>

Montreal Museum of Fine Arts. "Announcement of Results of a Clinical Study Unique in

Canada on the Effects of Art on Seniors." *Musée Des Beaux-Arts De Montréal*, 16 Nov.

2018, www.mbam.qc.ca/en/news/announcement-of-results-of-a-clinical-study-unique-in-canada-on-the-effects-of-art-on-seniors/.

Mullarkey, E.L. (2017). The Effects Of Art Therapy On Hypertension In Black American

Women. *Georgetown University-Graduate School of Arts & Sciences*.

Nainis N, Paice JA, Ratner J, Wirth JH, Lai J, Shott S. Relieving symptoms in cancer: innovative

use of art therapy. *J Pain Symptom Manage*. 2006 Feb;31(2):162-9. doi:

10.1016/j.jpainsymman.2005.07.006. PMID: 16488349.

Nicoll, Roger A, and Katherine W Roche. “Long-Term Potentiation: Peeling the Onion.”

Neuropharmacology, U.S. National Library of Medicine, Nov. 2013,

www.ncbi.nlm.nih.gov/pmc/articles/PMC3718856/.

Nielsen, Stine L, et al. “How Do Patients Actually Experience and Use Art in Hospitals? The

Significance of Interaction: a User-Oriented Experimental Case Study.” *International*

Journal of Qualitative Studies on Health and Well-Being, Taylor & Francis, Dec. 2017,

www.ncbi.nlm.nih.gov/pmc/articles/PMC5328392/.

O’Bróin J. F. *Livsrúm – Helende Arkitektur til Kræftpatienter og Pårørende*. Odder: Narayana

Press; 2015.

Oh, H, Chung, Y. (2021). A single case study of art therapy in a child with Crohn’s disease. The

Arts in Psychotherapy. Vol, 72.

Pereda, A. (2019). Science, art, and society and Klimt’s University of Vienna Paintings. Albert

Einstein College of Medicine. Creative Commons Attribution Publishing.

Phillips, R. Does Art Have the Power to Save Lives? The Healing Power of Art & Artists.

Renée B. Miller (March 19, 2014) “Wassily Kandinsky's Symphony of Colors.” *Wassily*

Kandinsky's Symphony of Colors | *Denver Art Museum*, Denver Art Museum, 19 Mar.

2014, www.denverartmuseum.org/en/blog/wassily-kandinskys-symphony-colors.

Reuters. (2021). “Lullabies, Other Music May Help Sick Premies.” *Fox News*, FOX News

Network.

Reynolds F, Prior S. 'A lifestyle coat-hanger': a phenomenological study of the meanings of artwork for women coping with chronic illness and disability. *Disabil Rehabil.* 2003 Jul 22;25(14):785-94. doi: 10.1080/0963828031000093486. PMID: 12959359.

Rollins, J. (2009). State of the Field Report. *Arts in Healthcare.* American for the Arts.

Ross EA, Hollen TL, Fitzgerald BM. Observational study of an Arts-in-Medicine Program in an outpatient hemodialysis unit. *Am J Kidney Dis.* 2006 Mar;47(3):462-8. doi: 10.1053/j.ajkd.2005.11.030. PMID: 16490625.

Rubin, J. A. (1999). *Art therapy: An introduction.* Philadelphia: Taylor & Francis

Skrzypek M. The social origin of the illness experience--an outline of problems. *Ann Agric Environ Med.* 2014;21(3):654-60. doi: 10.5604/12321966.1120619. PMID: 25292147.

Smith, Linell. *The Calming Power of Art*, Johns Hopkins Medicine, Mar. 2020,

www.hopkinsmedicine.org/news/articles/the-calming-power-of-art.

Spielberger, C. D. (1989). *State-Trait Anxiety Inventory: Bibliography* (2nd ed.). Palo Alto, CA: Consulting Psychologists Press.

Stice, Eric. "Risk and Maintenance Factors for Eating Pathology: A Meta-Analytic Review." *Psychological bulletin* 128, no. 5 (2002): 825–848.

Stuckey, H. L. & Nobel, J. (2010). *The connection between art, healing and public health:*

A review of current literature. American Journal of Public Health, 100(2), 254-263.

Trevisani, F., Casadio, R., Romagnoli, F., Zamagni, M. P., Francesconi, C., Tromellini, A.,

Di Micoli, A., Frigerio, M., Farinelli, G. and Bernardi, M. (2010). *Art in the hospital:*

Its impact on the feelings and emotional state of patients admitted to an internal

medicine unit. The Journal of Alternative and Complementary Medicine, 16(8), 853-

859.

The Van Gogh Gallery. (2019). Vincent Van Goh's biography: mental health. MISC.

Wecker, Menachem. "Fine Art Is Good Medicine': How Hospitals Around the World Are

Experimenting With the Healing Power of Art." *Artnet News*, Art World, 2 Aug. 2019,

news.artnet.com/art-world/how-hospitals-heal-with-art-1606699.

Wikoff, N. (2004). *Cultures of Care: A Study of Arts Programs in U.S. Hospitals. Americans for the Arts. Monograph.*

Wood, James M. "The Scientific Review of Mental Health Practice." *What's Right with the*

Rorschach?, Commission for Scientific Medicine and Mental Health, 2003,

www.srmhp.org/0202/focus.html.

Zickler, C. Halder, S. Kleih, S. Herbert, C. Kubler, A. (2013). Brain Painting: Usability testing

according to the user-centered design in end users with severe motor paralysis. *Artificial*

Intelligence in Medicine, Vol 59, Issue 2.

1000 Museums. (2020). 6 Famous Artists who struggled with mental illness. Art Authority LLC.