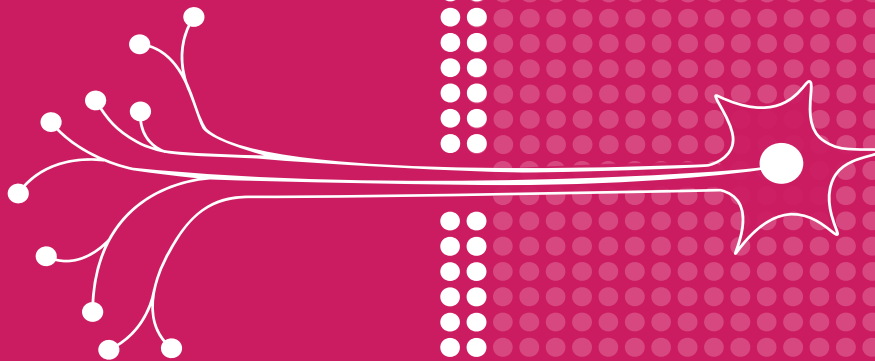


BEHAVIOR

INTERACTIVE INSTALLATION ART

DESIGNED TO PROMOTE BEHAVIOR CHANGE



AMY JORGENSEN

DESIGN REQUIRED

**Interactive Installation Art
Designed To Promote Behavior Change**

This thesis is submitted in partial fulfillment of the requirements for the degree of Master of Fine Arts in Design and approved by the MFADesign Review Board of *Massachusetts College of Art and Design* in Boston, Massachusetts.

MAY 2015

Gunta Kaza, Thesis Advisor
Professor of Design
Massachusetts College of Art and Design

Joseph Quackenbush
Professor of Design, Thesis Advisor
Massachusetts College of Art and Design

Brian Lucid
Professor of Design
Massachusetts College of Art and Design

Jan Kubasiewicz
Professor of Design, Coordinator of the Dynamic Media Institute
Massachusetts College of Art and Design



DEDICATION

To Susie and Jorgy

My mom

Susan S. Jorgensen

Apr 18 1951- Dec 29 2014
a constantly loving presence in my life

My dad

Robert O. Jorgensen

who helped make many of the projects in this
book a well-engineered reality

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Art is not a
one trick pony.

ABSTRACT

Art and design can have a potent psychological impact, not only through the content, but through the structural design of space and thoughtful manipulations of human behavior within that space. Informed by the relevant results of scientific research, well-designed works of art can contribute to behavior change by altering awareness and our neural processes. This feat can be achieved through design of space, light, and sound to create unique interactive experiences that alter brain function and neurochemistry. These novel experiences shake the blanket of the unconscious mind and help us understand what is stored in this intriguing repository.

Art can reveal new understandings of self in the following types of behavior:

- brainwave state
- creativity
- physiological function
- cultural habit

At the intersection of psychology, science, and art lies a jackpot of potential for improved mental functioning, as long as behavior change occurs at a personal level.



Fig 01 | Suite 14, 204 Westminster St., Providence, RI.

PREFACE: THE INTERSECTION OF ART & DESIGN

When Olafur Eliason presented his work upon receipt of the MIT McDermott Award in 2014, I stood up and asked him for advice for artists who aspire to his level of achievement. He began his answer with a succinct “ask why.”

If we engage in the artistic process by asking why we are making, doing, and designing, we end up with projects that potentially have greater relevance and meaning. Artists have the esteemed position of steering personal and cultural development, in part by the direct creation of culture, and in part by creating works that comment on our existing culture. It is this kind of inquiry that can bring art to a new level, one that requires design thinking.

Design plays a critical role in the conception and production of interactive installation art. In his book *Designing Design*, Kenya Hara eloquently discusses the boundary between these two creative fields. He posits that art is solely an expression of one individual’s “will to society” while design originates in society and exists to solve societal problems shared by many people. Not all art needs to be “well designed” because its only

purpose is self-expression. As soon as a piece of art aspires to a purpose relevant to society at large and seeks to engage that society (as the projects in this book attempt to do) design-thinking is necessary. The creative urges of the artist combine with the purpose of the project, relevant scientific research, and the needs of society, resulting in a successful partnership of art and design. This partnership breeds the production of effective interactions with art installations with purpose.

In the growing field of interactive installation art, considerations must be made in human behavior as it relates to the structure of a space. A sound environment and the architecture of a sculpture or a luminary can be designed to cooperate with each other in order to evoke a particular mental state or physical action. If an artist creates without concern for the public’s behavior, if he/she is complacent about how or if the public interacts with the fruits of their labor, then these fruits are relegated to the art world only. When an artist creates with the goal of educating or providing a particular experience, psychology, neuroscience, and engineering play an important role. Design required.

CHAPTER

ONE

 INTRODUCTION

“The illiterate of the 21st century, will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.”

Alvin Toffler



Fig 02 | Mr. Fred Rogers



Fig 03 | Mr. Martin Seligman

A key component to personal and interpersonal happiness is to accept yourself and your relationships exactly as they are. Mr. Rogers was on to something. Martin Seligman, the father of the field of Positive Psychology states “People who have the most positive emotion, the most engagement, and the most meaning in life are the happiest, and they have the most life satisfaction.” [Seligman 66] Unhappiness erupts within when emotional discord thickens, when we are disengaged and struggling to find meaning in our day-to-day existence. These are the times when accepting ourselves becomes a daily challenge and a dissonance develops between what exists and what we want to exist. Cue the soundtrack for the harrowing trip into self-inquiry and the need for behavior change. This feat involves both learning about self and unlearning old out dated habits and perceptions that are preventing the experience of happiness.

Discovering the source of our discontent is commonly facilitated with the well-trained help of a therapist. The types of therapy currently available to the average consumer is a bit dizzying and this is by no means a comprehensive list:

- Adlerian Therapy
- Behavioral Therapy
- Cognitive Behavioral Therapy
- Family Systems Therapy
- Psychodynamic Therapy
- Neurologic Music Therapy
- Art Therapy
- Psychoanalysis
- Interpersonal Therapy
- Scientology
- Eye Movement Desensitization Therapy
- Dyadic Developmental Psychotherapy
- Chess Therapy (the board game)
- Scientology

To cull the most potent and commonly used techniques from the wide world of mental health therapy is an exercise in gross generalization. However, there is one basic tenet that is widely accepted in the field of psychology. The source of our maladjustments, the reason for our discontent, is deeply rooted in our unconscious mind. If we can relax our conscious mind, the subconscious source can percolate up into awareness and we can understand ourselves with greater acuity. The conscious mind is a tiny raindrop relative to the unconscious ocean.... a vast storehouse of every experience we have had, every image we have seen, every belief we have formed thus far. The reasons for our good and bad habits, the source of our security and insecurity, the explanations for our attractions and repulsions... this information is tucked within us in a remote location, waiting to be uncovered.

Stefan Sagmeister, another artist-designer interested in human behavior and the unconscious mind, gave a talk at Boston University this winter about the intersection of design and happiness. He brought up many good points about how the unconscious mind is in charge of a majority of our decisions. He quoted Jonathan Haidt "...the conscious mind is this tiny rider on this giant elephant, the unconscious. And the rider thinks that he can tell the elephant what to do, but the elephant really has his own ideas." Obtaining a clear understanding of this tricky little mental entity, this elephant, requires the unconscious thoughts and feelings to make it into conscious awareness.

This therapeutic experience results in an improved level of individuation. Carl Jung, the luminary in the field of humanist psychology, invented this concept; individuation is the process of transforming one's psyche by bringing the unconscious into the conscious and has a holistic healing effect on the person, both mentally and physically. "Unconscious processes not only adapt us to the present situation, but they also influence the tracks we lay to guide our future behavior." [Bargh 78] Understanding our deep seated inner infrastructure contributes to behavior inspired by our whole self, not just a fragment. When we integrate conscious with unconscious, we

“Who looks outside, dreams.
Who looks inside, awakens.”

Carl Jung

have the potential to make less decisions based on irrational fears, dormant insecurities, or hidden agendas. In addition to the psychologically beneficial result of integrating the known and unknown elements of our psyche, one often gains increased problem solving ability, particularly in the field of design. Bill Moggridge makes a good point in *Designing Interactions* about the complexity of thought required to solve design problems. He recognizes that design intuition comes from an unconscious source and that this source, when combined with the conscious, gives us much more mental capacity with which to work. This explicit knowledge occurs to us during analytic, linear thought modes and makes logical sense, but doesn't always have the ability to solve the design problem.

Fig 04 | Cartoon by Bill Noth. *The New Yorker*. May 19, 2014.



“Have you tried turning off your conscious mind
and then turning it back on again?”

“If a problem has a large number of constraints, the conscious mind starts to get confused, but the subconscious mind has a much larger capacity.”

Bill Moggridge

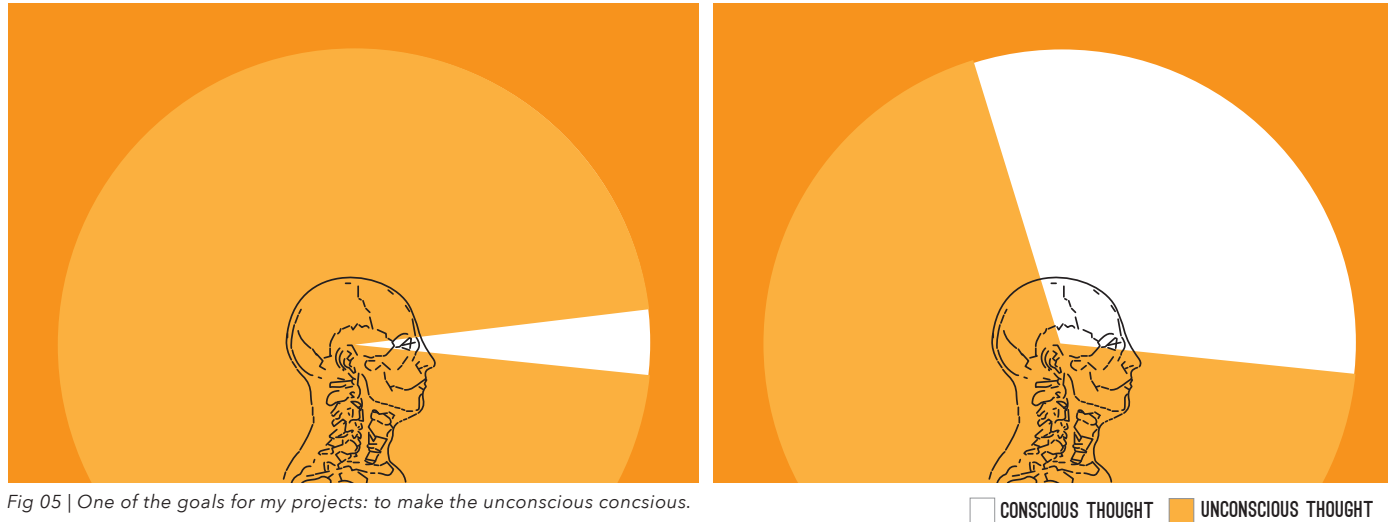


Fig 05 | One of the goals for my projects: to make the unconscious conscious.

THE UNCONSCIOUS MIND

Gaining access to the unconscious mind is a skill left undeveloped by most of us. Nobody wakes up and says, “I’m going to find out what’s happening in my unconscious mind today.” Often times the access is granted accidentally, like when childhood memories surface during a massage or yoga/meditation, or when we remember a vivid dream. A commonly recruited method to uncovering the valuable information hidden just below the surface of our conscious mind is, as stated previously, therapy. There are many other ways to arrive at a new mental territory, one of which is interactive installation art.

Since 2007, I’ve been producing interactive installation art in a variety of settings including traditional galleries, universities, a commercial ferry boat, a concert venue, the back of a moving truck, and a decommissioned NATO base. I’m very thankful for this wild variety. Despite this obtuse list of locations, the

content of my interactive projects has always maintained a tight focus: to create a shift in behavior. The four areas I work within all intersect with the function and state of the unconscious mind:

Brainwave State: The Golden Zone

Right now your brain is creating all sorts of brainwaves: gamma, alpha, beta, theta, and delta. As your consciousness shifts from fully alert (beta) to fully asleep (delta), you skip through the most therapeutically valuable states: alpha and theta. Information in the unconscious is most readily available to the conscious during these relaxed brainwave states, what I call the “Golden Zone”. Once this information surfaces and integrates, changes in behavior and thinking are a potential result.

Creativity

Creative thought is rooted in the unconscious mind. Creative insight and ‘a-ha’ moments occur most often during the aforementioned alpha brainwave state, when the mind is free to wander and lapse out of the analytic thought mode into the associative thought mode. There is a direct relationship between state of consciousness and creative thought. Therefore, if consciousness is manipulated to favor the creative state, more creative thoughts and behaviors can develop.

Physiological Function

Most physiological functions happen without any conscious control whatsoever. No one tells their hair to grow. But there is one major function that is both involuntary and voluntary for everyone: breathing. By bringing this function out of the unconscious and into the conscious, the chemical balance in the body changes, resulting in behavior changes that become more apparent over long periods of time.

Cultural Habit

We often defer to cultural behavioral norms while in groups in public. These choices are immediate and are a result of default behavior patterns ingrained in the unconscious mind. When regular habits are challenged and comfort zones expanded, behavior of an individual and/or group can shift into new territory.

“Designers have the ability and the training to harness the tacit knowledge of the unconscious mind, rather than being limited to working with explicit knowledge.”

Bill Moggridge

PERSONAL VIGNETTE 01

My intrigue with behavior change began in the bucolic setting of Bucknell University, where I earned Bachelor's degrees in art and psychology. These two fields would instill the wisdom required to be a successful art therapist, a profession that would combine my creativity with my urge to be of service to my community. I worked as a treatment counselor for at-risk youth in a lock-down facility for a year before I felt the stress levels beginning to make a deleterious impact. This caused me to question what kind of population I wanted to work with and if the therapist route was for me. Turns out it wasn't. I quit my job and moved to Costa Rica to surf and learn Spanish. When I returned, so did the urge to help, to do something positive. I worked with older youth the next time around, ages 16-21, young adults who were aging out of the foster care system in Oregon. This was more my bag and I felt like I was much more effective with an older crowd. However I was still at a loss.

Abraham Maslow was the first psychologist to study the psychology of healthy individuals. Up until his arrival on the psychology scene, everyone was studying mentally unhealthy minds and how to mend them. He coined the term, "the growing tip": the section of society that has all of their needs met, physically and psychologically, and can engage in creative pursuits. These are the innovators, the brains that change the fabric of our society with novel inventions, books, films, etc. I realized after reading Maslow that I was working with a very small section of the population, some of whom were in the growing tip, many of whom were struggling with drug addictions, criminal behavior issues, abusive relationships, etc.

My one-on-one counseling was contributing to improving these lives through behavior modification strategies, but I wanted to explore new forms of interacting to encourage change and growth. This is when I decided to try to make art that can provide a therapeutic experience and find out what I could contribute to our community on a larger, wider scale. I set out on a mission to create experiences, outside of one-on-one relationships, that can help an individual get to their growing tip.

I also learned during those earlier years that providing quality counseling is very difficult skill to master, one that is also hard to sustain. I couldn't hang. A round of applause to all the counselors and therapists out there who help us heal, self-actualize and reach our full potential: we need you and thank you.

“All the growth takes place in the growing tip: among that one percent of the population. It's made up of pioneers, the beginners. That's where the action is.”

Abraham Maslow

CHAPTER

TWO



BEHAVIOR CHANGE MEETS INSTALLATION ART

CONVENIENT BEHAVIOR CHANGE MODALITIES

Don't feel like talking? Can't find a therapist who 'gets you'? Have low-brow health insurance? Don't fret! There are plenty of other tactics to employ to improve your mental lot in life. One of the more widely known methods, requiring its own section in the bookstore, is the self-help book.

Some scholars posit that the first self-help book ever written was *The Egyptian Book of the Dead*, a guide filled with codes of conduct on how to live, die, and reincarnate with the most favorable results. In modern day America, the first self help books were of the legal flavor. Written to aid the common man in defending himself in a court of law without shelling out a week's pay for a lawyer, these publications empowered the people to take responsibility for their own statutory situations. The tidal wave of psychologically-centric self-help books began mid-century with the 1952 publication of *The Power of Positive Thinking*, by Norman Vincent Peale.

Peale, and the thousands of authors who followed, provided the public with tools and activities to fuel their penchant for therapeutic experience and removed the need for another person's input. The self-help section at Barnes & Noble not only made some types of therapists obsolete, especially cognitive behavioral therapists, but also made mental health therapy and behavior changing techniques available to a wider population.

NEUROAESTHETICS?

The list of other remedies for changing your psychological tune is another lengthy one. Weeding out the quackery helps shorten the list, but the research done in the field of behavior change provides evidence that everything from exercise,



Fig 06 | *The first self-help book? The Egyptian Book of The Dead*

“You have to change the way people see themselves before you can change their behavior.”

Bill Strickland

orgasm, fatty acid consumption, negative ion inhalation, full-spectrum light exposure, meditation, sensory deprivation, etc. all lead to an alteration of mental function. Art and design also makes this list, as the entire field of neuroaesthetics can testify. This fairly new field, emerging in 2002, is a sub-discipline of empirical aesthetics, the scientific study of the perception of art and music. Tack the 'neuro' on and now this study extends to the neural correlates of the experience of art. Brain function and mental state are predictably influenced by the presence of art, which is why organizations like “The International Network of Neuroaesthetics” exists, however, interactive installation art extends beyond this field of study. “Human beings in every culture seek out a variety of experiences which are classified as “aesthetic”—activities linked to the perception of external objects, but not to any apparent functional use these objects might have.” [Vessel]

Neuroaesthetics zeroes in on theories of perception and the role of the visual cortex in brain function. It does not address human behavior as a reaction to the experience of art. When an artwork is designed with a functional use, the impact has a greater potential to influence thought and behavior.

THE BRAIN IN SPACE

My favorite celebrity architect, Richard Neutra, had a keen understanding of how the built environment and structure of space must “take cognizance of our essential ‘neurological entity’” [Mallgrave 104]. His 1954 tome, *Survival of Design* explains how an “infinite number of stimuli, houses, road networks, and cities shape and alter the nervous life of the whole community.” [Neutra 83] A poorly designed space contributes to our psychological demise. Even though he is working within the context of architecture, the same principles apply to the design of functional spaces and the experiences cultivated by the designed environment. The visual cortex is a



Fig 07 | *Saint Patrick's Cathedral, Dublin, Ireland*

“What happens in space lends a miraculous quality to thought, which becomes incarnate by means of a design.”

Henri Lefebvre

Human behavior is influenced by:

The endocrine system

The nervous system

Early childhood experience

Ontogenetic processes and mechanisms

Belief systems of an individual/culture

The weather

Cortisol levels in the bloodstream

Other people

Developmental changes

Functional consequences

Breakfast

Neurochemistry

Your Facebook feed

sensitive system, input to the eyes reverberates to the rest of the brain.

When I studied abroad at Studio Art Centers International in Florence, Italy I took an art history class with Helen. Instead of giving us lengthy slide shows of Gothic and Renaissance art, this little old lady took us on countless church tours all over the country: this was where all the art was. During this hearty visual feast on frescoes, I learned that one of the common architectural tenets of Gothic church design was that tall spacious interiors lift the spirits and help humans connect with God. A visit to the Duomo (di Firenze), designed by Fillipi Brunneleschi is a testament to this. This is space that inspires awe and definitely has a strong impact on thought process and behavior.

THE PROBLEM WITH BEHAVIOR

El Sevier, a reputable academic publishing company, recently published an article titled “Behavioural biologists do not agree on what constitutes behaviour”. The researchers not only found no consensus in published definitions of behavior, but also a “surprisingly widespread disagreement as to what qualifies as behaviour” amongst 174 members of three behaviour-focused scientific societies. Their probe into the meaning of behavior resulted in the cultivation of an extensive list of specific actions and influences related to this nebulous concept.

For the sake of simplifying, the working definition of “behavior” for the next 176 pages, thanks to Merriam Webster, is the following:

The way a person moves, functions, or reacts to a stimuli.

“In terms of design, designers of all disciplines have the power to influence behavior through their creativity by the type of information they convey.”

Suzannah Mathur

Depending on the type of intervention, the change in movement, function, or reaction most commonly exists when the stimuli is present and disappears once the stimuli is removed. For example, late night laptop usage has a negative impact on circadian rhythm; the blue light of liquid crystal (LCD monitors) inhibits the pineal gland’s ability to release melatonin, the hormonal lullaby. When the laptop is removed, sleep cycle behavior is normalized. For all intents and purposes, the projects I developed influence behavior during the interaction (subjectively, depending on the participant) but can potentially have an effect long after the initial interaction.

INTERACTIVITY IN THE ARTS

Interactive art shifts the focus away from a one-dimensional experience of consumption to a multi-dimensional experience of participation and contribution.

The definition of interactive art is fairly flexible. Your eyeballs are having an interaction with this screen right now, but that doesn’t make this art. Interactive art requires some kind of action to be taken by the public in order to create an experience: art that asks “try this!”. This call to action can entail a specific input, a decision about where to put your body in response to the object, or a reaction to a stimulus. No matter what the interactive piece of art is, something always happens if the viewer chooses to participate.

The viewer is not just viewing and the art is not a static object frozen in time since the day it was created. Interactions can certainly happen while viewing a static piece of art, but these interactions happen invisibly in the mind of the viewer as a direct result of the stimulation of the visual cortex.

The fact that “Interactivity as a medium produces meaning.” [Muller] is not new. According to Greek history, interactive

PERSONAL VIGNETTE 02

Once upon a time, I sold an acrylic painting for \$100. It was a tormenting and exhilarating event. I cashed the check in singles, took the wad of cash home and threw the whole thing as high into the air as possible... a shower of cash confetti. Before the big purchase, the buyers were struggling to recall the exact hue of their throw pillows to ensure the painting would be a nice accent piece for the living room. My art had immediately been reduced to an element of interior decor, a superficial add-on. This seemed so dirty to me at the time, dirtier than the shower of cash I basked in.

I didn't stop painting, but my fervor for it began to wane. I moved back into 3D and reconnected with my undergraduate passions for sculpture. My first work that required electricity and a bit of tech know-how was "The Motion-Sensor Operated Love-Blowing Machine". This full size sculpture of a woman from the waist up responded to passersby. As gallery visitors approached, a fan and a light would turn from inside her chest and blow 'love' on them.

The presence of a person changed the appearance, sound, and physical feeling of the sculpture. The static nature of looking was gone. The one-dimensional experience of consuming art was gone. In its stead was an intrigue; people were aware that the sculpture was responding to them but they weren't sure exactly how. This was a definite a-ha moment: the robust experience of a person experiencing my art was the new reward for art-making, I was no longer just expressing myself. I had discovered 'interactive art'.



“Artistic practice can no longer revolve around the construction of objects to be consumed by a passive bystander.”

Faye Ran

Fig 08a - 08b | *The Motion-Sensor Operated Love Blowing Machine*. 2006
Fig 09a -09b | *opposite*. Paintings from my 2D years



“The difficulty lies not in the new ideas – but in escaping the old ones.”

-John Maynard Keynes

art has been around since as early as the fifth century. The first interactive artwork involved a couple of Greek guys and the unveiling of a painted curtain. The more interesting and concrete interactions, those which have more of a noticeable impact, are more recent.

When Marcel DuChamp and Man Ray made “Rotary Glass Plates” in 1920, the public had to turn the piece on and then stand at a distance in order to fully understand the optical experiment. If a person did not step outside of the normal art-viewing behavior, what they saw was a machine-like static sculpture. It was up to the public to turn the piece into the dynamic, kinetic invention the two Dadaists intended. Marcel and Man were the first influential artists to ask the public to perform an action, to play a role in their own experience, and to choose what to do with their bodies while looking at art. These two men were at the helm of the Dadaist movement, an iconoclastic cultural movement that bent the boundary between observer and participant.

A coworker recently shared her experience of the most basic form of interacting with art: viewing. She was brought to tears by the enormity and intensity of the cultural icon *Guernica*, Picasso’s anti-war mural at the Maria Sofia Reina in Spain. A painting or a sculpture can certainly stir up emotions, memories, or inspiration and touch upon an individual’s mental state. Some critics say *Guernica* helped to bring world-wide awareness to the Spanish Civil War; the 25’6” wide masterpiece has served as a dramatic reminder of the needless suffering caused by war.

An integral component of human evolution is the development of new technology. Just as we expect more performance and features from the next version of the iPhone, we expect more from our experience of art. This is the same reason why the sleep-number mattress is a thing. We want more from all categories of consumption. That said, painting and sculpture

and other traditional forms of art are not obsolete and continue to have a powerful neuroaesthetic effect on viewers. A technology-free non-pillow top mattress is still comfortable. However, viewing is a passive activity requiring only the act of looking and harnessing only the personal choice of direction of eye gaze. Future art consumers interested in developing their experience of art (meaning: evolving from a consumer to a participant) will require more from their interactions with a work of art, just as they do technology and mattresses.

A testament to this fact is a comparison of queue length in NYC. The queue for the next iPhone was not as long as the queue for Marina Abramovic’s famous show at the MOMA, “The Artist Is Present”. The interaction involved sitting across from the artist and looking at her. That was it. People went crazy for it: every morning for the month of May 2013, eager participants waited for hours and raced to the top floor to queue up again, waiting to be a part of the art.



“In the seventies and eighties, we lived in a society of spectacle, in the nineties in the society of participants, and we are now developing a “society of interactors.””

Nicolas de Oliveira

Fig 10 | *Rotary Glass Plates*. Marcel Duchamp and Man Ray. 1920
Fig 11 | *opposite. The Artist Is Present*. Marina Abramovic. 2013

PERSONAL VIGNETTE 03

San Francisco based artist Kal Spelletich was the first interactive artist who made a mark on my future. At a naïve 21, I was thoroughly wowed by an art show I happened upon at the Jack Hanley Gallery. He put a metal bed frame and mattress on a hinge and attached it to the wall. On the floor adjacent to the bed was another bed full of ominous metal spikes. The public could strap themselves into the bed on the wall, press a button, and the wall-mounted bed would come crashing down (with the participant strapped into it) and hover over the metal spikes. I witnessed a woman try the push-button thrill, break down in tears, and then give Kal a huge hug of gratitude for the experience he'd created. It was a superficial brush with death, and for some it was exactly what they needed to disturb their status quo.

When I saw this reaction, it immediately put stars in my eyes for Kal. He had created art that had a profound psychological impact. This woman left the gallery that night with a new perspective on herself. The combination of adrenaline, fear, and relief (and whatever other unknown factors) had come together to culminate in a breaking of her emotional wall. I wanted in.

When I moved to Maine, I knew one person. My brother's old college buddy was great, but I wanted to grow my network, so I joined an artists group. The leader of the group and another prime mover in my artist career was Amy Stacey Curtis. Amy is an artist who works with large-scale installation and examines the passage of time. She made "Undoing" (2012) by crocheting for one hour everyday for one year, a commitment to her art which resulted in an enormous white blanket: 72' long x 9'wide.



Fig 13 | **TIME.** Amy Stacey Curtis. 2012. A participant unwinding the crocheted material.

Fig 14 | **TIME.** Amy's full year of crocheting, untouched, prior to the opening.

The large swath of fabric was laid out flat on the floor next to a 9' clear plexiglass box. The public had the opportunity to unwind the single string of yarn and place it in this receptacle throughout the duration of the show. In the first moments of the opening, the blanket covered the whole floor. By the end of the show, the slow dissemination of each crochet stitch, the unraveling of Curtis' time, resulted in an empty floor and a box full of crinkled white yarn.

This kind of degenerative art interaction challenges the public to question; perhaps they examined the value of time spent towards an achievement or the importance of effort made on a project. Every stitch undone was a reversal of Curtis' time and an eradication of her concerted effort. At the closing of her show, what she had to show for her year of dedicated crochet time was a crimped up strand of yarn. It looked like a massive serving of Ramen noodles. The public had a potentially new appreciation for the ephemeral nature of time and what it means to intentionally create and destroy. Curtis' work was enmeshed in the experience of the materials she used through the time-based participatory generation of a new object. The experience each individual had with the work was an unreproducible, one-time only event, a temporal specificity that adds value.

“Installation art is repeatedly distinguished as a genre of the late-twentieth century by a notable upsurge in artists’ stated interests in the potential for social change fostered by an emphasis on the experiential outcome of art.”

Irish Museum of Modern Art



ART AS EXPERIENCE

Graciela Carnevale, an Argentinian artist, began using experience as the medium for her art in a piece she designed for the Experimental Art Cycle in 1968. She locked the public inside a gallery. She hermetically sealed a giant glass door shut and the blank walls of the gallery offered nothing to the people trapped within. This act was purposeful and deliberate; the artist intended to give the public the experience of being a prisoner, with the hopeful outcome of understanding their freedom with newfound appreciation. Whether or not the involuntary participants arrived at the desired outcome is difficult to determine, but the experience of going to a gallery opening was completely transformed by Carnevale. The only art was the experience.

Experimental Art Cycle is an extreme example of participation in an artwork, but the elements Carnevale describes are a motivation in my work as well. She says, “I think an important element in the conception of the work is the consideration of the natural impulses that get repressed by a social system designed to create passive beings” [Bishop]. Interactivity in the arts helps to eliminate this inherent passive nature. It is our job as artists to design experiences that inspire novel action and promote the flexibility of personal comfort zones. Drawing attention to an individual’s comfort zone is one avenue for disrupting habitual behaviors.

Fig 15 | **Experimental Art Cycle.** Graciela Carnevale. 1968
A woman ducks through the broken glass wall to escape the gallery.

DECONSTRUCTING THE COMFORT ZONE

Wading through the dross of the same-old same-old can be comforting because we know what to expect. Our self-constructed comfort zones exist without our awareness but also sometimes without our blessing. It is only when these invisible zones are challenged by an external stimulus that we instantly become aware of our personal limitations. Comfort zones can be a cozy place; they can also be terribly limiting. Art can break these zones down, as long as a person is willing to participate.

Alice Aycock successfully challenged the public’s comfort zone with her 1975 work, “A Simple Network of Underground Wells and Tunnels”. She designed the large-scale installation “... as a means for exploring different psychological environments in which spectators can explore feelings and memories”. [Ran] In order for this exploration to occur, courage to break out of the comfort zone was required.

Spectators weren’t really spectators, but participants. They had to climb down ladders and crawl through deep tunnels which were designed to “compel viewers to engage with the space, to feel and face their own reactions and memories.” [Ran] Aycock’s approach to interactivity asks the participant to have courage: climbing down a ladder and into a dark tunnel is not a commonly popular diversion. The novel environment of a dark tunnel is also not a welcoming inviting space, but one that reaps more rewards than a leisurely stroll through a gallery. The direct correlation between risk and reward is relevant to each participant.

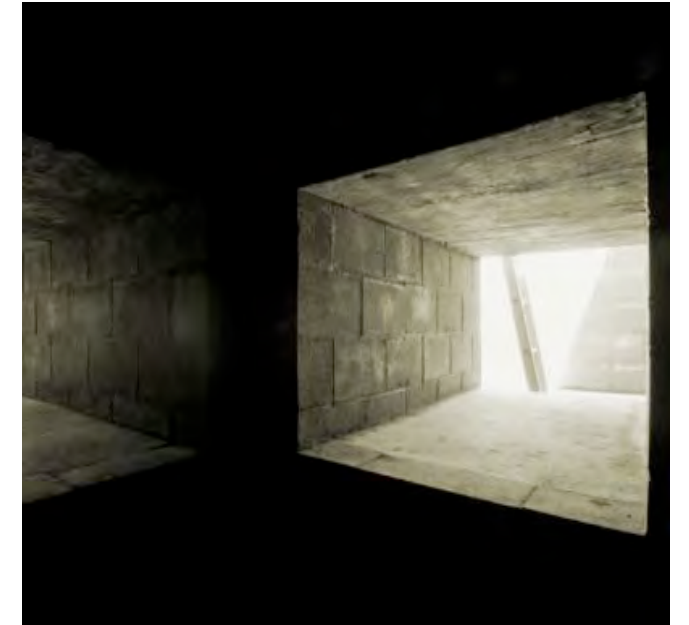


Fig 16-17 | **A Simple Underground Network of Wells and Tunnels.** Alice Aycock. 1975
To participate in this art, the public must descend these ladders to enter a maze of dark tunnels.



Artist Allan Kaprow states, “The best participants have been persons not normally engaged in art or performance but who are moved to take part in an activity that is at once meaningful to them in its ideas and natural in its methods.” [Bishop]. Kaprow is unknowingly describing why James Turrell’s take over of the Guggenheim rotunda was such a success.

His site specific light installation “Aten Reign” [2013] was best viewed from lying flat on the floor beneath the giant atrium that serves as an expansive spiral staircase winding up to the 6th floor. Coaxing New Yorkers to lie on their backs in the middle of a museum is a challenge to the comfort zone, but because Turrell considers human factors, he created a natural setting for reclining. The floor of the Guggenheim was littered with relaxed belly-up bodies, all eyes skyward and transfixed by the gently moving colors of light. Being a willing participant in this experience was unique in its camaraderie creation. Strangers lying next to me were oddly familiar; the napping French couple across from me displayed an endearing vulnerability.

When public behavior exits the realm of predictable and regular, it provides an opportunity to see oneself and others in a slightly new light. The invisible walls that existed between visitors of the Guggenheim that summer day changed shape as a result of Turrell’s ability to stretch comfort zones.

Fig 18-19 | **Aten Reign.** James Turrell. 2014
The lightest oval is on the sixth floor of the Guggenheim. This is the perspective from lying on the floor and looking up at the rotunda
Fig 20 | opposite. A meal at the Tin Tin Buffet, Biddeford, ME.



THE THREE DESIGN CONSIDERATIONS

There are three main factors that have a profound influence on my design process. These ingredients, when combined with the installation, result in the best possible experience of participation and consumption of art. Eliason told me to ask why, but the whys get answered in the conception of the project.

These are the hows of my process:

Existing Architecture

How can I work within the existing structure of the installation space to achieve the goals of my project?

How can I seamlessly insert my installation into the already built environment?

How can I use existing materials in the architecture to my project blends naturally or perhaps intentionally unnaturally?

Existing Light

How is natural light going to impact the visual experience of the project?

How can a luminary accentuate the positive and attract participants?

How can lighting design contribute to the achievement of the project goals?

Human Factors

How are people going to move in this space?

How will they approach it and what are the touch points for the interaction?

How will they leave?

How can the design of the physical structure maximize the behavior-changing benefits of my project?



CHAPTER

TWEE



CHANGE IN BRAINWAVE STATE



Fig 21 | The first Brain Wave Synchronizer

Fig 22-26 | opposite. The scene from *Pokemon*, “Electric Soldier Porygon”, which caused seizures due to photic stimulation

AUDIO-VISUAL ENTRAINMENT

The cerebral cortex is the bathing cap of the brain. It is the outermost layer of tissue in our most valuable 8-10 pound organ. Every student who has taken a Psych 101 class is familiar with the somatosensory system map illustrating which areas of the cerebral cortex enervate which part of the body; the hands and mouth hog most of the real estate up there.

Sensory stimulation can easily influence cortical activity and therefore, brainwave activity. The stimulation is only effective if it falls in the frequency range of 0.5 to 25 Hz and the best avenue to stimulate is via the optic nerve (sight) and cochlear nerve (sound). Touch works as well, but a large area of skin must be stimulated in order to have a noticeable effect on brainwaves.

Visual Entrainment: Photic Stimulation

The power of the optic nerve on brainwave state was first discovered in France when an observant doctor, Janet Piaget, noticed his patients’ anxiety, depression, and hysteria symptoms decreased when they gazed at a spinning, spoked wheel in front of a kerosene lantern [Siever]. This subtle stroboscopic flashing had some kind of psychological impact that provided temporary relief of mental disturbances. With the invention of the EEG in 1956, researchers were able to discover what was happening to the brains of these patients. The efficacy of this intervention was due to a significant increase in the production of alpha waves [Siever]. This alpha output and its subsequent effects put ‘photic stimulation’ and ‘alpha brain wave states’ on the map of therapeutic applications.

The very first photic stimulation machine was built in the late 1950’s, right around the time these first fruitful studies were published. While on duty for the US Government, Officer K.

Kroger noticed a large number of naval radar operators drifted into trances while watching the blinking light of the radar. This accidental effect was transformed into an intentional action when he partnered with Sidney Schneider to build the first commercially available visual entrainment machine, the BWS or “Brainwave Synchronizer”.

At first, the BWS was used primarily as an electronic aid for hypnotic induction for labor pain management on neonatal wards. Chicago anesthesiologist Max S. Sadove, M.D., published his work on how BWS-induced hypnosis could reduce anesthetic agent requirements during general anesthesia [Sadove]. The BWS was also employed in therapeutic settings to expedite the entry into a calm, relaxed state. Despite the positive influence of this technology, it is only fair to report that this kind of photic stimulation can also have deleterious effects.

On December 16, 1997, the animators of *Pocket Monsters*, more commonly known as “*Pokemon*”, unknowingly created an extremely effective photic stimulation for their Japanese audience. The infamous episode, “Electric Soldier Porygon”, or “Computer Warrior Porygon”, depending on the translation, sent 685 people to the hospital for seizures and related complaints (nausea, dizziness, temporary blindness)[CNN]. This “*Pokemon Shock*” was caused by 4 seconds of a flashing red and blue light, animating the explosion of a vaccine bomb inside a computer [CNN article]. The “low luminance, 12 Hz alternating red/blue stimulus” [Siever] was luckily an isolated case but demonstrates the power of a mere flashing light at a particular frequency.



Audio Entrainment: Binaural Beats

Another accessible technique to alter state is via the auditory system. Binaural beats have been well documented to promote an alteration of brain wave state [Vernon]. These specific audio tones are perceived as a subtle auditory beat and can be used to entrain specific neural rhythms through the frequency-following response (FFR). FFR is the tendency for cortical potentials to resonate at the frequency of an external stimulus. These rhythms, imperceptible to the ear, create a vibrational pattern that can be programmed to mimic the theta and alpha brainwave frequency. For example, if the tone in the left ear is 563 Hz and the tone in the right ear is 553 Hz, the difference is 10Hz. This 10Hz only registers inside the brain and provides a seed vibration for brainwaves to entrain to.

MIND MACHINES

Modern 'mind machines' are a bit more streamlined and designed for the masses, not just for neonatal wards or doctors with hysteric patients. They use LEDs in concert with audio entrainment technology to achieve the same results. These are readily available from a large number of companies that can ship you your own pathway to an altered state. There are 'mind machine' programs for everything from promoting relaxation to increased focus, based on the user's chosen settings.



Fig 27 | A typical mind machine with audio and visual stimulation

Fig 28 | opposite. Brion Gysin's **Dream Machine**. 1982



ENTRAINMENT IN THE ARTS

The aforementioned technology has primarily been confined to the arena of science and for use in the privacy of one's own home or in a medical office. Only a few artists have built brain wave entrainment devices for consumption by groups in a gallery or in the public sector. In 1982, Brion Gysin designed a column with carefully engineered slits for light to shine onto the closed eyes of the public. He placed the column on a turntable, turned the light inside on, and via photic stimulation, was entraining brains into a meditative state.

The schematics for Gysin's "Dream Machine" are available for download so anyone can construct their own kinetic art. If a Youtube video is considered art, then a quick Google search for binaural beats reveals quite the variety of homespun flicks promising everything from deep sleep to a psychedelic trip without the psychedelics.

CS01

CASE STUDY 01 The Meditation Machine



The Meditation Machine

100 Rooms. Milepost 5. Portland, OR.
05.2009

The Meditation Machine was my first attempt to use visual and auditory entrainment to facilitate a desired brainwave state, the “Golden Zone”. I was invited to be a part of a group show at Milepost 5 in Portland, OR; each artist had an entire room in an vacant building that used to be an old folks home. The building had been empty for years and this show was a part of a revitalization effort for the city, organized by artist Chris Haberman.

PROJECT GOALS

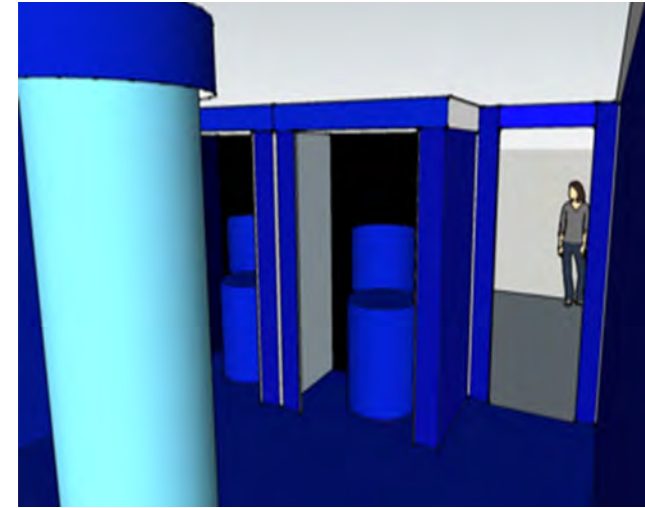
to provide an immersive experience that helps participants enter the Golden Zone

MATERIALS

vinyl, motor, incandescent light, clear acrylic sheeting, wood, chairs, headphones & MP3 players

Fig 30 | Initial 3D Rendering of the installation

Fig 31 | A participant entering and approaching a listening station



DESIGN CONSIDERATIONS

Existing Architecture

I was assigned two adjacent rooms on the top floor of the complex (per a request to be away from the noisy action). Walking down a loud, crowded hall directly into quiet room of people meditating had potential for awkwardness. Originally I thought I only needed one room, but because I was striving to create a shift in mental environment, the first room became a much-needed port of entry into this new environment. The second room, the installation site, had two closets and a ceiling fan with an area of about 140 square feet. The fan could not be removed so I decided to integrate it into the piece. The closets also were not going anywhere so those also got included in the final iteration.

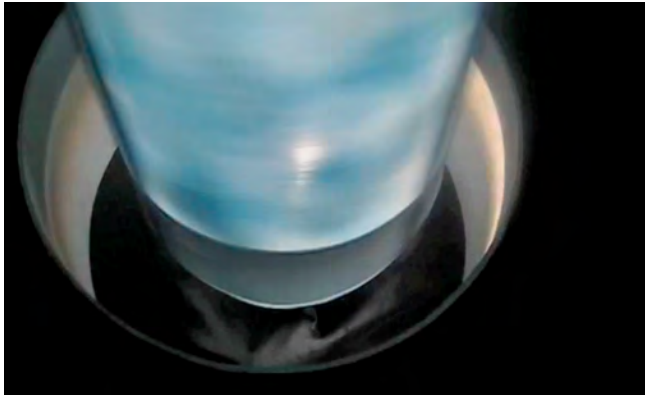
Existing Light

Due to the importance of light in the installation (light is the source of the photic stimulation) I had to block out

all other interfering light coming in from the 2 windows. In this particular environment, natural light could not be harnessed. The electrical set-up of the room was pretty standard, so including luminaries into the design was possible.

Human Factors

The Meditation Machine was only one exhibit in a giant show of 100 artists so most of the people coming in for the experience were very well stimulated. I thought about a good way to slow them down to prepare them for the weird cave-like experience. This is where the first entry room came in handy. I knew there would be a crowd of people moving in and out so traffic control was a major factor. Awkwardness ensues when people just walk in, turn around, and walk out, in addition to creating the bottleneck effect at the doorway to the room. Also, since some people like a private experience



of meditative states, I wanted to create a private area where people would not be disturbed by others entering and exiting. I also wanted options for sitting and standing depending on how much time a person wanted to commit or how comfortable they wanted to be.

DESIGN

The fan motor was the perfect tool to create the photic stimulation; I removed the blades and designed a 2' diameter column out of clear acrylic sheeting stretched tight over an armature. This floor-to-ceiling spinning fixture was in the center of the room and provided an obvious focal point. The dark vertical lines I painted around the periphery of this translucent column created the rhythmic flashing. Inside the tall column was an incandescent spotlight shining straight up, illuminating the entire kinetic fixture.

The walls of the room were a nondescript white and taupe color. Immersion happens more readily when any cues of an expected environment are removed. The brain has no framework or preexisting knowledge about what to do in a novel environment. The new stimulation and decision making process involves new neurological territory which aids in feeling immersed. To delete any evidence of this second room being a room, I created a monochromatic visual field. On a materials mission to the best recycled art supply store in the country, SCRAP, I came across a giant roll of reflective blue vinyl. I snatched this magnificent find up for somewhere around \$20 and proceeded to line the entire room with it. The two closets in the room were also covered, as they were built into the project as listening stations.

The endless supply of blueness came in handy to prevent daylight from spilling in from the windows, causing interference with the light of the central spinning column. There were 4 listening stations to provide the aural entrainment: 2 provided a private seat with speakers installed equidistant from the left and right ear, 2 were for those who were more comfortable standing and using headphones. The tones were specialized tracks of binaural beats programmed to resonate at the 6 Hz rate to match the visual entrainment. Each listening station had a direct line of sight to the central spinning spire.

To address the traffic control, I installed a line of poles to manipulate the trajectory into and out of the installation and to compliment the verticality of the lighting design. I used the first entry room to install a giant back-lit display explaining the piece and recommending silence.

THE INTERACTION

Participants walked into the room, saw the light, and immediately knew if they could stay or not. The light cast from the column was just enough to illuminate the seating options and the headphones. Each person wandered in and put on headphones, chose their area and sat or stood in front of the spinning spire while listening to the rhythmic soundtrack. The longer they stayed, the deeper the potential for and entering into an altered and meditative state. Nobody passed out or had a seizure and most people lauded my efforts at creating an environment with such a purpose.



Fig 32-33 | The spinning of the central light column

TAKEAWAYS

- Provide options for participation. Including sitting and standing options and private areas was a good move based on how much each area was used. This is beneficial, especially for including the participation of children and the elderly.
- Experiences can educate. Most of the people I talked with had never used meditation aids and were glad to learn about this field.
- Off-gassing is a thing. Not only did I learn about human behavior but I also learned about material behavior. Working with plastic sheeting and vinyl is an olfactory experience, especially when an entire room is filled with it. Fortunately, installation was complete a few days before the opening, giving the plastic fumes time to evacuate the premises. That smell was definitely not meditative. Know your materials.

CONCLUSIONS

I include this early project because it was a formative experience for me as an artist/designer. The concept of 'being a part of the art' hit me square in the face and motivated me to continue working towards this goal. There was a combination of two components in this project: education and experience. People read the written explanation both before and after their Meditation Machine experience and many had questions about the science behind the two phenomena I'd harnessed with the sound and light design. Many people came back with friends and/or to try it again. After seeing the fruitful results of this project, it was clear to me that interactive installation art was a critical part of my future.

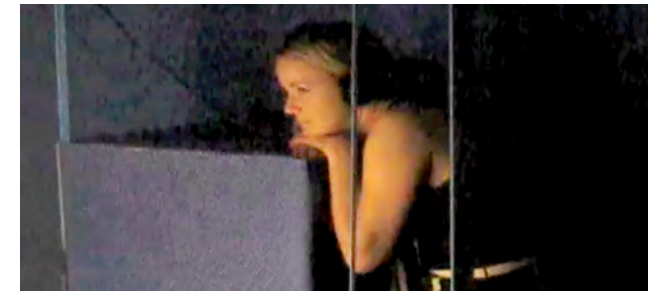


Fig 34-37 | Stills from the documentary of the project

"I don't often meditate with my eyes open and I found myself in position that I often find myself in when I meditate... when my jaw dropped open I just went 'OH! Okay! That was a shift in consciousness!"

"It seemed like the artist clearly wanted viewers to be interactive with the art and I think that's definitely achieved!"

"I feel like I was forced to pull inward for a minute and focus on...nothing... or focus on relaxing and on what I was seeing and how it was making me feel."

*"Who know that a ceiling fan could be so... meditative. I love it."
-Mayor Sam Adams*

CS02

CASE STUDY 02
Dream State

Dream State

Fresh Media. **Cyber Arts Gallery**. Jamaica Plain, MA
and **Nave Gallery**. Somerville, MA
03.2014

Dream State was my first installation that was not site specific. Working within the parameters of two very different galleries, I decided to make the installation a wall hung sculpture that used the same technology as the Meditation Machine. This was an opportunity to design a drive-thru meditation experience. We lapse in and out of the day-dream state throughout the day. This was an attempt to facilitate it by standing in an exact location related to the dynamic sculpture.

PROJECT GOALS

to create a walk-in (wall-hung) experience of the day dream state of consciousness.

MATERIALS

masonite, plexiglass, DC gearhead motor, steel rod, nylon, neon, speakers



DESIGN CONSIDERATIONS

Existing Architecture

Cyber Arts Gallery has a highly visible wall at the front of the gallery facing the sidewalk. The front of the building is mostly glass with a knee-high wall, so anything installed on the front wall can be seen by anyone who drives/walks by - a dream install location! Also the wall is museum grade, meaning solid (not drywall), so installing is much easier. My original inspiration for the design of this project came from this wall in Jamaica Plain.

The other gallery was clear across town in a gallery with a completely different look and feel. Nave Gallery in mind, so I had to make it site NON-specific. This was my first attempt at making a project that could potentially be installed anywhere.

Existing Light

Light poured in from the glass windows and there was just a little ambient street light at night. The ceiling of Cyber Arts is wired so any kind of light could be installed. Nave Gallery had less flexibility but plenty of access to outlets. Both galleries had track lights that were on individual circuits so I had plenty of control.

Human Factors

Since this was an audio-visual entrainment project, people needed to know where to stand in relation to sound and where to direct their gaze in relation to light. Because the experience would be more effective if it was immersive, just like the Meditation Machine, I had to figure out how to immerse people in a site non-specific way, a way I could pack into the back of a U-Haul and ship across town. I decided to try to avoid using headphones to explore immersion without this obvious tool.



Fig 38 | top. Installation site at Cyber Arts

Fig 39 | left. The installation site at Nave Gallery

MATERIALS MISSION

As soon as metal becomes a part of the production equation, you don't necessarily have to pick up your nearest acetylene torch, but you do have to have an understanding of how metals behave. Every metal has its own tensile strength and responds differently to compression. I needed the curve of the speaker house be a perfect circle. It was non-structural, meaning, it was not load-bearing so strength and compression were not major considerations. I chose a metal that could be easily put through a "Metal Bender" set at the exact diameter of 52": square steel rod. The flat surface makes it easier to work with in the bender.

Fig 40 | Color-coded extruded steel rod at Turner Steel in Westbridgewater, MA.

DESIGN

I took wall measurements and started tinkering in SketchUp, a seriously dumbed down version of AutoCAD 3D. To help people forget they were in a gallery, I blocked their peripheral vision with 2 sculptures that jutted out 2' from the wall. These served as elaborate speaker houses and dictated where to stand. In order for an optimal experience of the binaural beat soundtrack, a participant's eardrums had to be equidistant from the surface of each speaker. Since the way people oriented themselves in space was so critical, I wanted to make something compelling for them to stand in front of so I decided on a big glowing disk.

The inner curve of the sculptures was another perfect circle, an offset frame of the large central disk. This large colorful circle would be back-lit to draw people in. Human beings are a bit like moths. I planned to mount it on a DC gear head motor to create a spinning, flashing effect. This spinning illuminated object was the same tactic employed in the Meditation Machine to produce the photic stimulation.

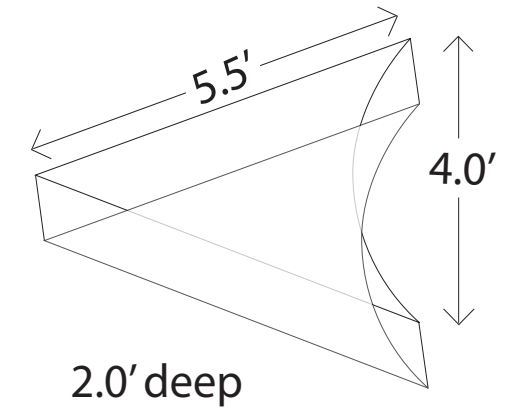


Fig 41 | One of the drawings I gave to Sara, the welding undergrad

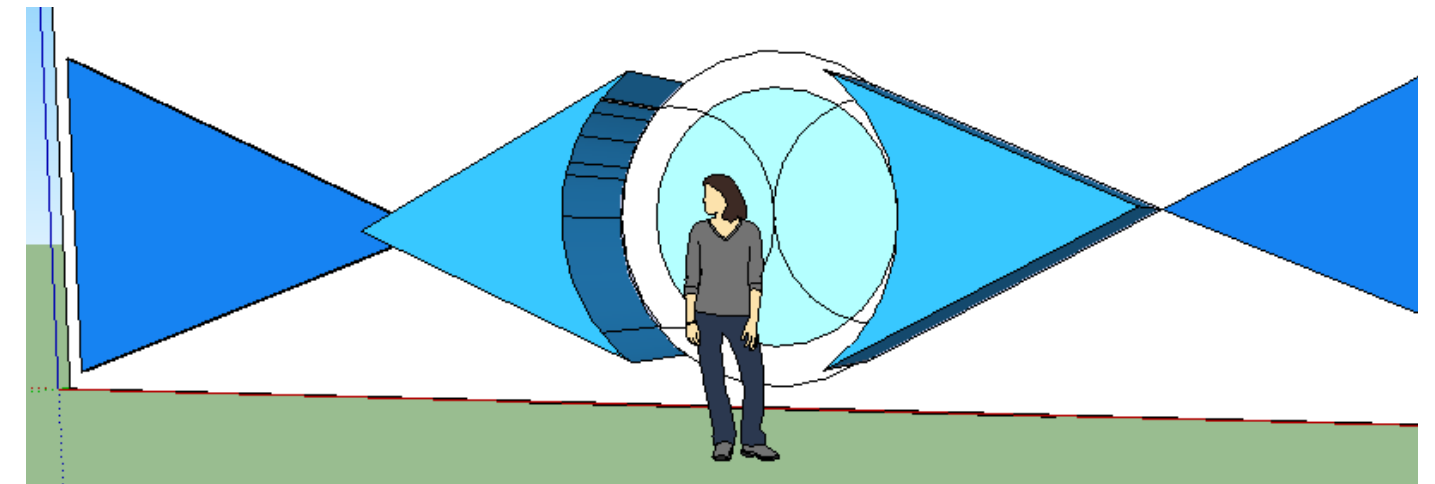


Fig 40 | Initial 3D Rendering included twice as much wall space



TRIAL & ERROR

The original idea was to spin the whole 46" disc. Quarter inch plexi is not exactly a lightweight material so when I hung it on the wall with the motor and gears, it worked, but the motor sounded like it was seriously struggling. The groaning of mechanical parts is not dreamy. I quelled my anxiety over motor burn-out by changing the engineering completely. I made the plexi a static element and wall mounted it. The stroboscopic flashing could be much more easily produced with a balsa wood (light as a feather) fan blade passing through an illuminated white circle. This circle was roughly eyeball-height and was integrated into the design of the graphic for the plexi disc.

To illuminate the disc I used an 11" neon ring I had custom made for another installation from 2012. Neon is great because it emits very little heat and has a smooth even quality of light. The only drawbacks are its fragility and the enormous cords and power supplies required to make it glow.

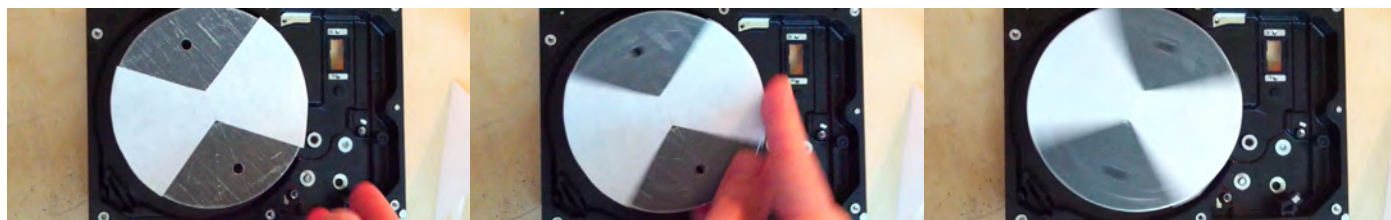


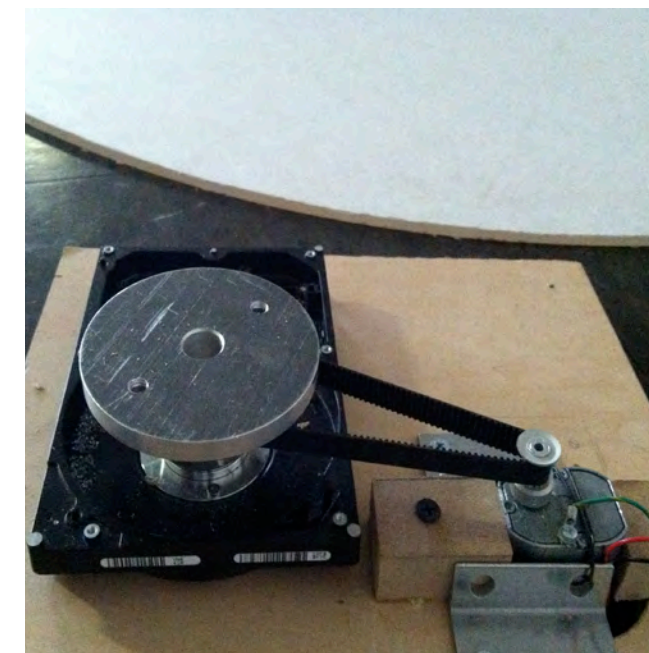
Fig 42 | Experimenting with using a hard drive as a mount for the disk
Fig 46 | below. Transporting the disk from Altec Plastics to MassArt

The process for designing the speaker houses was another rocky road. I wanted the sculpture to appear to be an extension of the gallery wall, very clean and geometric. The structural design remained constant, a 3D triangle, but the materials changed a number of times. These sculptures had to frame the 46" disk so the curved edge of each 3D triangle had to be a perfect curve. At first I planned to build the frame

Fig 43. opposite left | Assessing whether or not the smudge on the disk was visible. It was.

Fig 44. opposite top right | The assembled motor with gear and belt.

Fig 45 opposite bottom right | The final disk- hanging anchor with neon.





out of metal, and learn how to weld. I went shopping for steel rod. Once I had the rod, I learned that welding is not a skill you can just pick up on the weekend so I hired a willing undergrad to help me.

The idea of the future occurred to me (after I bought all the steel rod) and the idea of moving and storing 2 giant steel frames was untenable. Instead of welding the whole thing, I had only the curved edges bent and cut to size. The rest of the frame I made of wood.

Another calamitous situation was the design for the plexiglass disk. There were a few iterations of the design for the disk which I printed on large format photo film. The first non-adhesive photo film didn't work: I smudged it with my finger while installing. This first design for was based on the mandala pattern that Carl



Jung touts as having consciousness-altering capabilities. The complexity of the lines did not gel with the simplicity of the sculptural speaker houses.

The second design was much simpler and simultaneously complemented the angles of the triangular sculpture and the curves of the disk. However, the second print was on adhesive photo film and when I applied it to the disk, the number of tiny bubbles was grossly apparent. I ended up combining what worked in the first try with what worked in the second try to culminate with a final design on non-adhesive film. This time the installation process was smudge-free.

Fig 47 | top left. The first design printed on photo film

Fig 48 | above. The second design printed on adhesive photo film.



Fig 49 | Jan Kubasiewicz "getting his brain melted". Courtesy Daniel Buckley.

"I want to dream while I'm awake!"

Henry Quackenbush



THE INTERACTION

State showed at two very different galleries but the interaction and feedback was entirely the same. Many reported feeling transported and expressed the desire to sit down. Some participants mentioned they wanted to come back when the gallery was quieter to have a more intimate experience of the installation. One woman, a practicing meditator, stated that although she did not enter into a meditative state, that she could see how this interaction would promote the state if she was in a different environment.



Allowing yourself to lapse into any state of relaxation is much more difficult in public, while standing. Some people found it easier to stand with their eyes closed to concentrate on shifting their state. The size of the structure made it clear that it was a one-person-at-a-time single user experience.



Fig 50 | previous. The installation at Cyber Arts
Fig 51 | opposite. A participant having a moment
Fig 52 | above. The installation at Nave Gallery
all images courtesy Sixten Abbott

TAKEAWAYS

- Wall mounting complex structures at exact angles is no cake walk. Structural engineering might be useful to study. I built 2 giant cleats to hang the sculptures flush to the wall, but once they were up, the front of the triangles sagged just a hair. I had to prop up the front edge of the sculpture with a 1x2 that got knocked out by the Rumba, the night-time cleaning machine.
- Photo film is dangerous territory, especially in large sticky swaths. Practice using your materials in small doses before going big.
- Simple, well designed hand-outs are effective at educating participants about how to participate, but not everyone needs/wants them.



CONCLUSION

Walk-in experiences of altered states are hard to manufacture. The dream state of alpha brain waves is best achieved in a quiet setting, not a busy gallery. In order to really relax and let consciousness drift, standing up is not the favored stance. In this iteration of a brain wave manipulating experience, I learned that most people really like the oddity of the fan blade flashing and the surround sound of the binaural beats. Because it was novel and new, the installation succeeded in attracting participants, but in terms of the actual goals of the project, I don't think it succeeded. It functioned well as a pedagogy: it taught people about photic stimulation and brainwave entrainment. The demonstration of entrainment tool usage



Fig 53 | The instructions to optimize your experience"
Fig 54 | Fan blades passing through the focal point

CHAPTER

FOUR



CHANGE IN CREATIVITY

**“No problem
can be solved
by the same
consciousness
that created it.”**

Albert Einstein



Fig 55 | Thomas Edison taking a nap

Thomas Edison was well known for his solution-finding napping. When confronted with a problem he couldn't think his way through, he would sit down with a handful of bullets. He would hold his quandary in mind and start to nod off. As he lost consciousness, he would lose motor control and all the bullets dropped to the floor. When the noise shook him awake, he would have a solution to the problem. It was this shift in consciousness and complete immersion in a different state of mind that likely provided his solutions. In the modern day university or office environment, there are very few opportunities that foster a shift in state of mind.

THE GOLDEN ZONE+CREATIVITY

I interviewed two executives whose job it is to innovate within their company. I was curious how these people in high-power positions manage to come up with new creative concepts when their jobs depend on it, thus increasing the pressure to think creatively. Andy Miller, Chief Innovation Architect at Constant Contact, said in our interview: "I just take a long drive. Sometimes if I can't come up with anything I'll just sit back in my chair and put my headphones on and kind of zone out, you know?"

I also interviewed Michael Davies, Chairman of Endeavor Partners, a company that helps clients "innovate for growth and anticipate the future". He prefers to take walks or ride the subway to come up with creative solutions to work-related problems. He also spends a lot of unstructured time gazing out the window of his Kendall Square office in order to "get into the zone" of creativity.

All of these actions involve a shift in thought mode and/or an opportunity to daydream or 'space out'. These two men

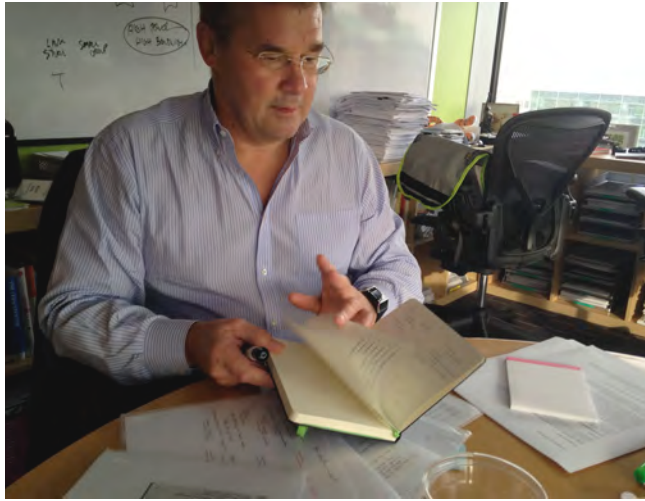


Fig 56 | Michael Davies explaining how he gets into the creative zone

have a high degree of understanding of their own creative process and, based on my inquiries, experience a lot of stress on the job but do not let it interfere with their ability to innovate and think new thoughts.

CONTEXTUAL FOCUS

The ability to switch from analytic thought mode to associative thought mode is critical to creativity, a skill known as contextual focus [Vartanian]. Analytic thought is a coherent and logical separation of a whole into its constituent parts in order to study the parts and their relations while associative thought is a broader sweep of uncontrolled and unconscious activity involving mind wandering. When a person is in need of a solution, he/she must defocus attention and enter into more associative form of thought in order to make new connections [Gabora], like Andy does when he goes for a drive and zones out. Howard-Jones and Murray (2003) suggest that associative thought ensures originality and suggests that expanding the focal point of attention may improve creativity and overcome fixation, a condition that occurs when one is unable to move beyond a known problem solving approach in order to develop a new one [Janson]. In this expansive state, one loosens thought structure to allow new ideas or insights to occur. It is this daydreaming state that provides the fertile ground for creative thought formation.

NEURAL NETWORKS

A resting state 'neural network' is a specific pattern of synchronous activity that occurs during different states of consciousness and while engaged in specific mental functions. Default Mode Network is one of five different resting-state neural networks that is activated during daydreaming and is more active in creative people [Ferris]. It is an interconnected

and anatomically defined brain system that preferentially activates when individuals focus on internal tasks such as daydreaming, envisioning the future, retrieving memories, and gauging others' perspectives. The mind obliquely solves problems while daydreaming, a phenomena known as "The Shower Experience", which is a common experience of cognitive inspiration involving drifting thought patterns.

Flashes of insight occur "while the conscious mind temporarily retreats" [Smith] and a spike in alpha brain wave production occurs during these experiences. Many studies have shown conclusive evidence that creative thought is associated with the alpha brain wave state [McGreevey]. Jung-Beeman et al (2004) observed this "alpha effect" during subjective experience of the 'A-Ha!' moment. It is during moments of insight that brainwave frequency drops into the Golden Zone of 8-12 Hz. Additionally, Fink et al (2007) [Vartanian] found that the more creativity-related a task is, the stronger is the synchronization of alpha activity. This adds more value to time spent in the Golden Zone.

Measuring creativity is a difficult task, in part because it comprises a wide assortment of mental faculties. The Psychologist Mihaly Csikszentmihalyi has studied creativity extensively, specifically the state he refers to as creative flow, and concluded that it is very highly correlated with outstanding creative performance. Insight is another area of creativity involving those sudden moments of clarity, the "a-ha" moment, which appear to pop into our awareness. These moments do not usually happen while in a flow state, but there are specific neurological events that occur just prior to the eureka moment. Creative fluency is another category, which is our ability to riff off new and innovative concepts or ideas. The more ideas you can generate on a particular topic, design problem, alternative uses for an object, etc., the higher your creative fluency.

"Daydreaming is a psychological necessity...it is where we go to cultivate the self."

Michael Pollan

CS03

CASE STUDY 03
The Solution Space

PRE-CASE STUDY CASE STUDY

An Accidental Prototype

One fateful spring day in 2014, while browsing the web for interesting things to do with myself, I came across the Irish Sound, Science, and Technology Association. This little organization was searching for submissions for their annual conference at the University of Ireland in Dublin.

What I laid eyes on:

“This year’s Convocation examines the social impact of sound in the real world: natural soundscapes, music, technological sounds, mediated sounds, spaces, places and sites. Technology cannot be divorced from the interconnections with cultural output, social practice and aesthetics. We seek to contextualise all sound-making and its sciences and technologies. What is the societal impact of our artistic and technical practice with sound? How does our research and practice impact the wider community? Finally, given that our practice is, for the most part, financed by public funding, what is it that we are giving back?” [issta.ie]

I immediately applied. The piece I submitted was the *Dream State* installation from the previous chapter. The green islanders liked it, and once enough time passed for me to forget about my application, I received an official invitation. The only problem was that this email outlined the rules of the installation process. No holes were to be made in the wall. I freaked. This was a large wall-hung sculpture. With no wall, there was no piece. My email back to the Irishmen described my anxiety with great detail and I offered to recreate the piece so it was free standing. Since I was using the same technology, they obliged and I had a new mission of creating one art installation to go.

Because I had to tote my work across the Atlantic, I decided to make it easy on myself and give myself a tight framework within which to create. Rules inspire innovation. I decided to try to make an installation that fit inside my roly bag (travel suitcase with wheels) so *Dream State’s* original steel frame and 40 pounds of masonite Masonite were removed from the equation. My flight to Dublin connected in Paris and I’d heard bad things about checked bags getting lost by the French. Now the roly bag was much smaller: carry-on size to prevent the risk of showing up at a sound art conference without any sound art.

Hours of materials research ensued. I needed to create a walk-in sculpture out of a very lightweight material, one that could survive a good bang around. It had to be impervious to tearing, staining, and wrinkling and easy to sew on a machine. My next-door neighbors were having work done on their house and the external façade of the house was stripped away, exposing a large swath of Tyvek. I went over and poked it, tried to tear it, and to my delight it displayed the toughness I was after. I ordered 300 yards.

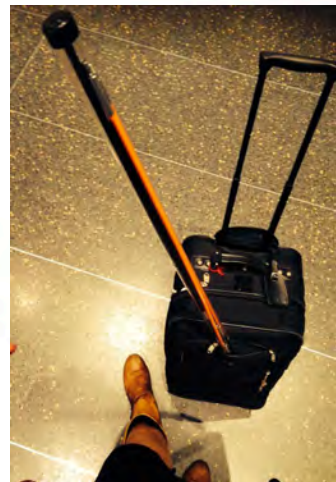


Fig 58 | I fit the entire installation in a carry-on bag



Fig 58 | Gazing at a distant horizon line alters the way we perceive space, and therefore time

“Experiences of awe bring people into the present moment, which underlies awe’s capacity to adjust time perception, influence decisions, and make life feel more satisfying than it would otherwise.”

Madeliene Kruhly

As I was sketching forms for this massive amount of Tyvek, (the next iteration of **Dream State**), I kept my goals in mind. The experience had to be immersive, non-site specific, and walk-in. I was also thinking about the mental state of awe that we enter while looking across enormous expansive space, like on a mountaintop or at the beach.

In a video by “The Biological Advantage of Being Awestruck”, Jason Silva explains the sociobiological benefits of this unique experience and outlines how awe creates the drive to survive. He refers to research by a prominent psychologist Nicholoas Humphrey, who concludes that moments of awe create a series of neurochemical reactions that change the way we perceive time. Another study done at Stanford reveals this experience conclusively leads to an increase in life satisfaction.

As we perceive more space, our sense of time also expands. I harken back to Stephen Hawking’s statement “The farther out in space you go, the closer to the beginning of time you get.” I can’t begin to dissect what Hawking’s intellect so easily comprehends, but based on the simple fact that we all exist on a space-time continuum, as perception of one component of the continuum shifts, so does the other.



Fig 59 | Attendees of the ISSTA Conference exploring Peak Experience
Fig 60 | left. Experimenting with crinkling Tyvek





I decided to let Dream State evolve into a wholly different form while retaining the same sound technology. The Tyvek became an expression of a mountain peak, of a location of which might inspire awe. Since horizon = horizontal, I drew dozens of parallel horizontal lines on the inside of this peak-shaped structure. Participants could walk inside the white peak and gaze softly at this loose representation of a distant perfection, an attempt to unify these two polar opposite natural environments with an unnatural material.

The sound technology remained the same with the addition of a second set of binaural broadcasting speakers. It was very difficult to create an experience of sheer awe with a Tyvek sound tent, but one interesting moment of awe did arise due to an unexpected sound wave interaction. The speakers were equidistant from the ears of the participants, one pair at knee level and one pair at head level. Because the same waveform

was broadcast from two locations at a specific distance from each other, there was a sound canceling effect at particular areas in the room. While circumnavigating the installation, the negative interference pattern caused 'dead spots' where the sound wave had no amplitude; where you situated yourself in the room determined how loud the sound was. This was wholly unintentional. Sometimes you don't know if a project is going to work as intended; this unknown territory is where you can surprise yourself.

I write about Peak Experience because the form and function of the project was a loose sketch of the creativity experiment I designed months later. The goal of The Solution Space was similar to that of Peak Experience, an immersive space to alter state but with the addition of promoting creative thought. The knowledge I gained from testing the sound tent out on sound-techy Europeans informed my design decisions for this next project.



TAKEAWAYS

- Create a space that actually alters sense of space, not just comments on this phenomenon
- Don't be afraid to employ headphones: in terms of the desired brain wave state alteration, headphones deliver a stronger result than speakers
- Binaural beats are no big deal; add something else to the soundtrack to make it a little more interesting

*Fig 61 | opposite left. A participant listening to all 4 speakers
Fig 62 | opposite right. The installation site at the University of Ireland: a
Fig 63 | The Irish are so helpful: Michael, Sofie & Eoghan rolling up and packing me up*

“To enter a Turrell Ganzfeld is to enter an apparently boundless illuminated arena without the focal points we typically use to situate the body in space. Moving forward in these uniform fields is disorienting and, for some viewers, simply overwhelming.”

Patricia Failing



THE GANZFELD

“A visual field with no perceptible edge”

Gazing at a Ganzfeld promotes the alteration of a sense of space because there is no perceptible edge to the visual field. When the brain cannot tell where it is in space, altered states are more easily achieved [Wackerman]. As our sense of space shifts, our sense of time shifts, and as our perception changes, a shift in consciousness precipitates. This is the same idea as the concept behind Peak Experience. Warping sense of time is a critical component to shifting states of consciousness. When we are in deep sleep we have no perception of time passing; when we are fully awake we have a strong sense of time passing. The in-between state can be inspired by a long list of interventions, visual field manipulation is the one targeted in this project.

Citing James Turrell is a no-brainer: an artist who has a particular acumen for crafting a true Ganzfeld. His manipulations of light to warp space create a sense of wonder and mystery wherein your eyes are not sure what to grab onto. When I saw his piece, *Iltar*, at the Guggenheim, I was initially

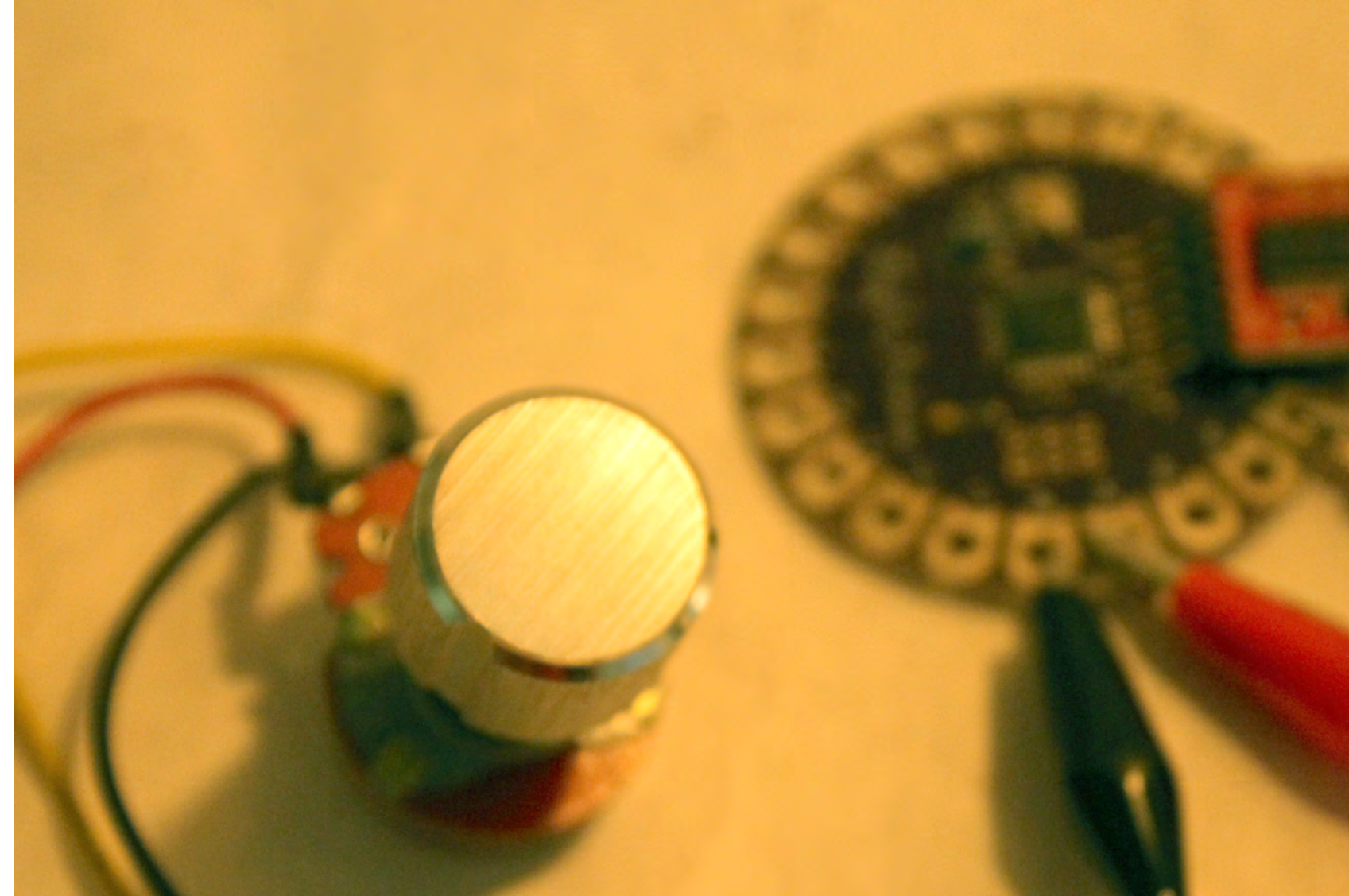


Fig 65 | The Frequency Selector: a potentiometer knob gives participants the ability to choose color of light and frequency of sound

*Fig 64 | opposite. James Turrell. **Breathing Light**. LACMA. 2013*



miffed. We waited for 30 minutes to get into the room to find a small wall of people standing in front of a gray canvas. I didn't get it. It didn't compare to the striking beauty of *Aten Reign* I'd seen earlier. I was wondering why people were standing so far away from the piece. The safety tape on the floor was positioned about 3 feet from the wall and the crowd was positioned about 10 feet away. The power of social norms was clearly restrictive. I said excuse me about 15 times and broke through to the other side of the crowd. As I got closer to this bland gray rectangle, the illusion began. This was not a flat surface at all, but a deep, cavernous smoky space that had no end. The security guard balked at me, ending my immersion in the experience, but the take-home message was clear: proximity to the art object has an impact on the effect of the illusion.

First Ganzfeld experiment

My first whack at creating my own Ganzfeld happened early on in my grad school experience as a response to an assignment entitled "You Are Here" with Jan Kubasiewicz. I decided to employ projections of slowly moving ethereal light on a curved screen. The participants sat in front of this screen so their entire visual field was flooded with the colored light. They put on headphones and listened to a soundtrack of binaural beats. I used an arduino Arduino and a potentiometer to make a "Frequency Selector", which gave participants the ability to choose a color of the spectrum and a frequency of binaural beats that appealed to them the most. This experiment guided many of the design decisions I made in *The Solution Space*.

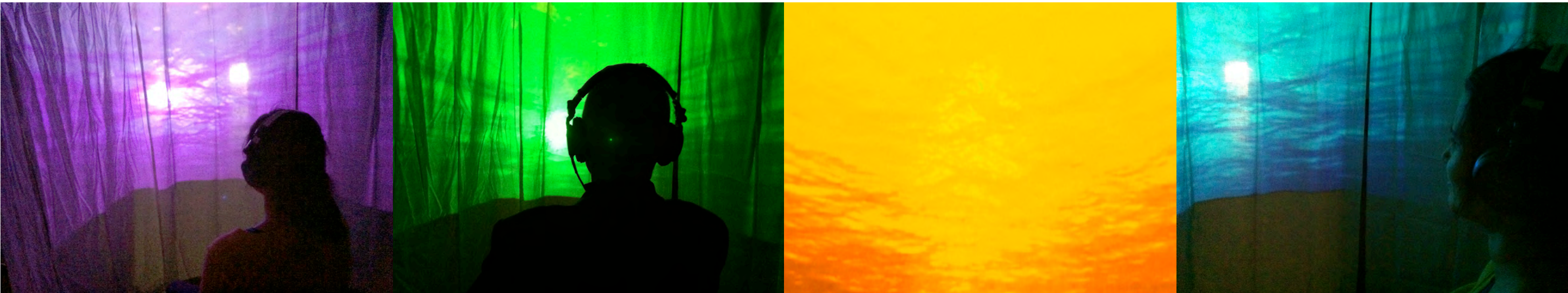


Fig 65-68 | The first participants in the Ganzfeld experiment

Fig 69 | above. The frequency selector

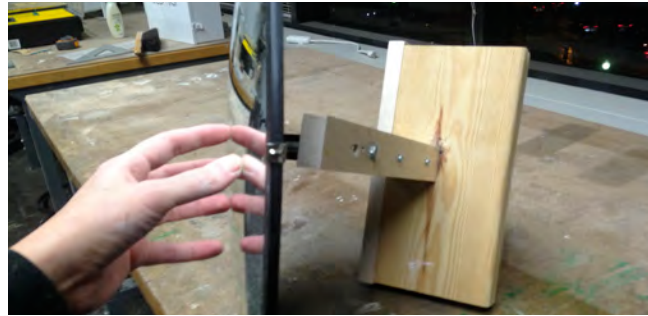


Fig 70 | above. The four way mirror at the top of the tent to warp space and create illusion

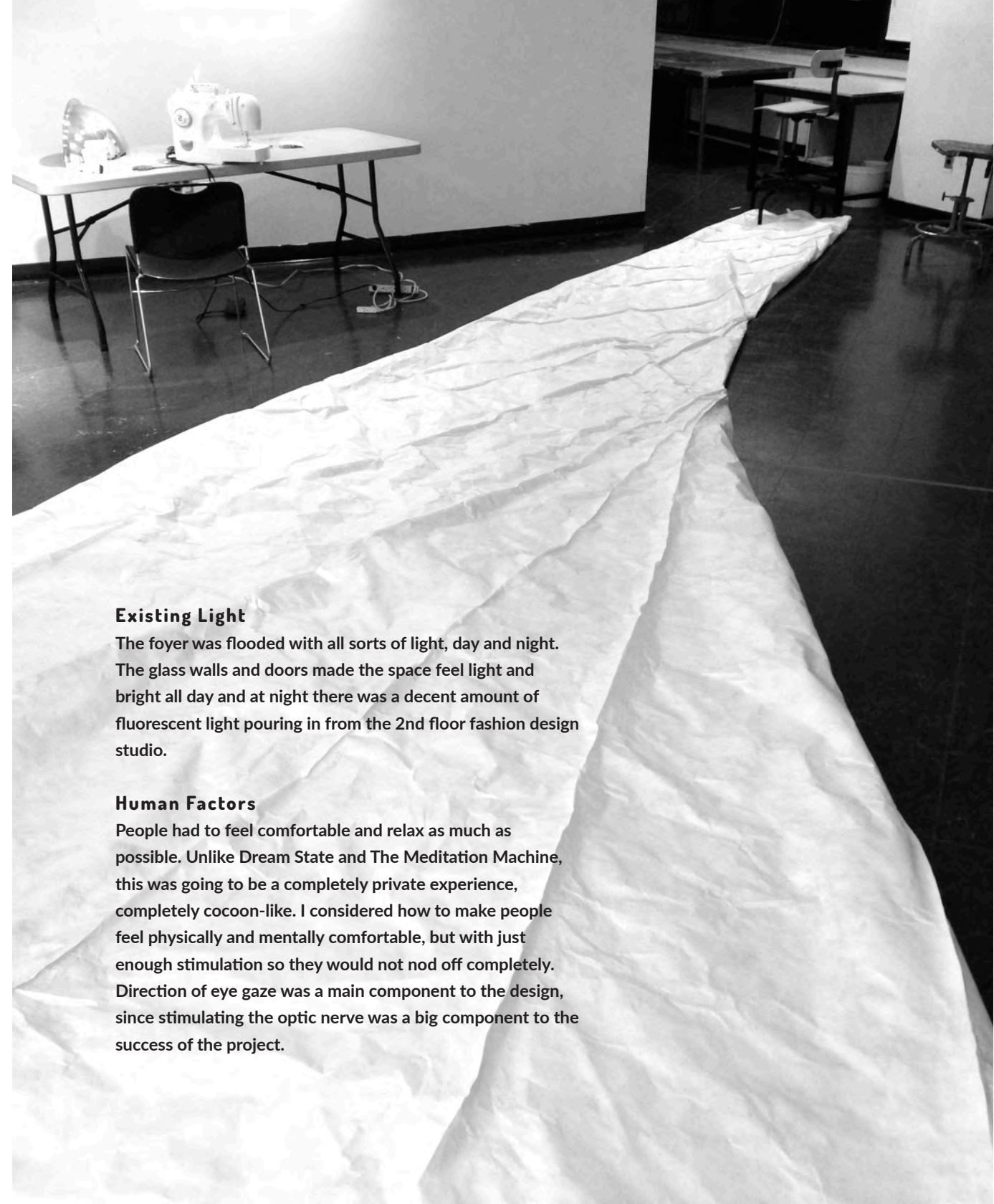
Fig 71 | After making models out of paper, I sewed 900 sq. feet of Tyvek into a curved tunnel

DESIGN CONSIDERATIONS

Existing Architecture

The long and semi-grueling process of finding an appropriate and available space on the MassArt campus to install The Solution Space was worth it. I was looking for a 30' tall space in the Tower building where there was plenty of foot traffic and not a lot of environmental noise. I'm no Filippo Brunelleschi, but the height of the visual field, the magnitude of space, would hopefully have a similar impact as lofty church-like spaces.

There were a few spaces on the docket but got crossed off due to fire exits and egress issues. The final space, a giant foyer on the first floor, was not my first choice but ended up being a perfect match for the installation. The ceiling was roughly 3 stories high, I wanted the project to span from ceiling to floor but this was too high and would require more structural engineering than I was prepared for. Luckily the 2-story floor was 20' tall and the cement framing for the building and the metal safety rail for the 2nd floor provided a solid point to attach the top of the tent. Because this existing architecture was beyond the reach of a ladder, I had to recruit 2 facilities workers and the biggest piece of industrial grade equipment I've had to use to date: a construction scissor lift.



Existing Light

The foyer was flooded with all sorts of light, day and night. The glass walls and doors made the space feel light and bright all day and at night there was a decent amount of fluorescent light pouring in from the 2nd floor fashion design studio.

Human Factors

People had to feel comfortable and relax as much as possible. Unlike Dream State and The Meditation Machine, this was going to be a completely private experience, completely cocoon-like. I considered how to make people feel physically and mentally comfortable, but with just enough stimulation so they would not nod off completely. Direction of eye gaze was a main component to the design, since stimulating the optic nerve was a big component to the success of the project.



DESIGN

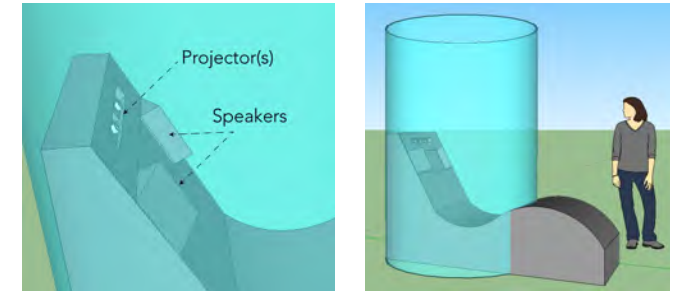
Originally I had planned to use projection or electric light to create a subtle sense of movement through this Ganzfeld to add to the warping of the visual field, similar to my first experiment. I met with fellow MassArt student, Phil Gedarovich, and light artist, Seth Riskin at MIT, to get a better handle on my options, but my efforts towards this end were in vain. The final installation area ended up being so flooded with light, both during the day and at night, that projection of any sort was not a viable option. I aborted mission on the manipulation of light and focused more intently on the design of the physical space.

The Tyvek tent I toted to Dublin was 9' tall with a footprint of about 8' x 8'. I used this structure as a model and tripled the height to maximize the novelty of the visual field. To further my mission of warping depth perception and Ganzfeld production, I put a four-way mirror at the top of the 27' tall tunnel to reflect the entirety of the pure white space back to the participant reclining. This would contribute to the illusion of a never-ending space.

The recliner was carefully modeled after Hammacher Schlemmer's anti-gravity chair to help people relax and take in the experience. The chair was outfitted with headphones with a soundtrack of binaural beats, a white-noise-like Tibetan singing bowl, and an intermittent bell to ensure participants were not falling asleep. White noise was included to block out the environmental sound and contribute to the immersion in the experience.

Fig 75 | opposite top. Initial experiments with Phil Gedarovich and a short throw projector

Fig 76 | opposite bottom. Experimenting with the four-way mirror and projection mapping inside a tunnel

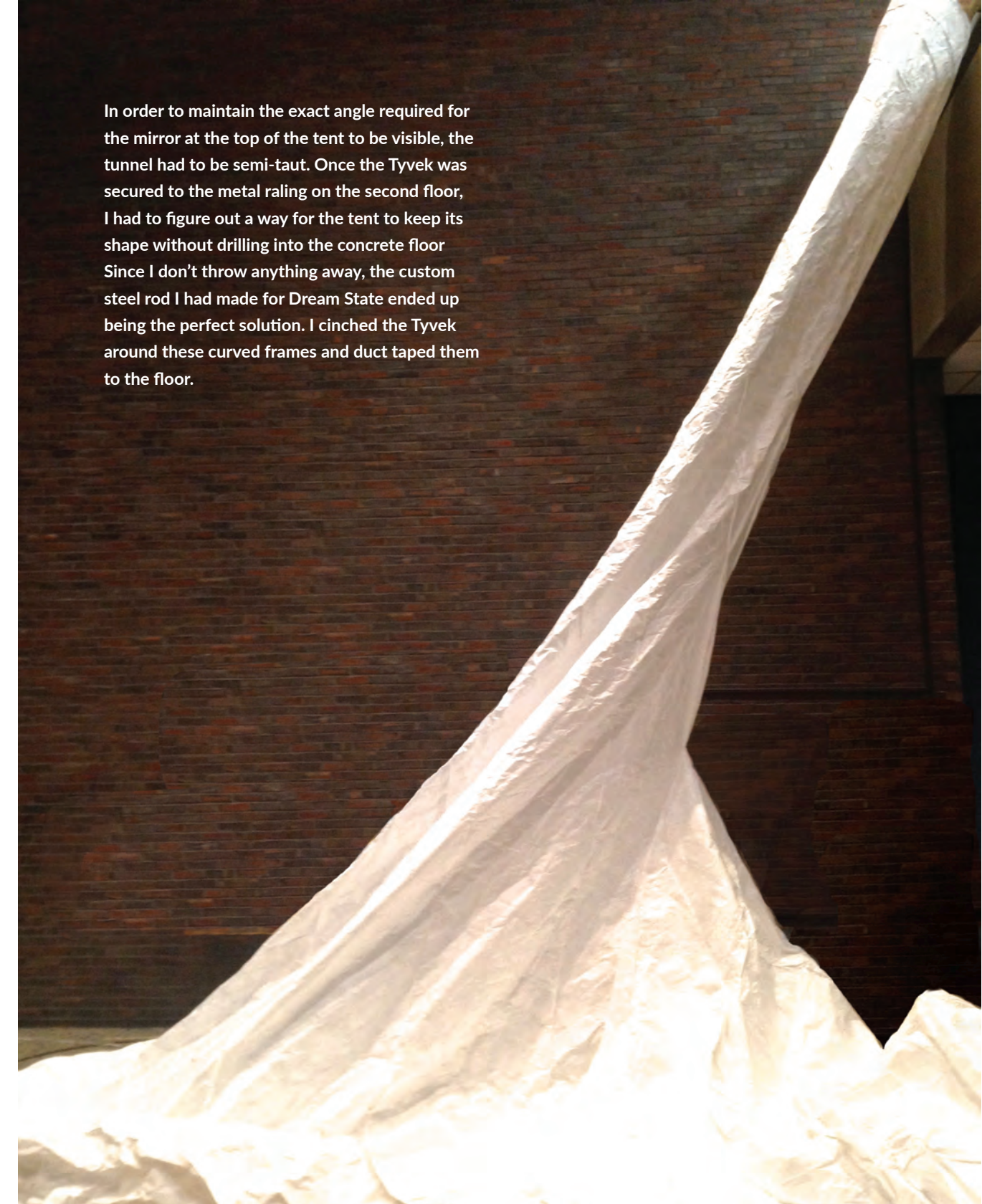


*Fig 72 | Work in progress: the chair to angle participants' gaze skyward
Fig 73-74 | above. The original design did not include headphones, but speakers built in to the headrest and a vertical column*

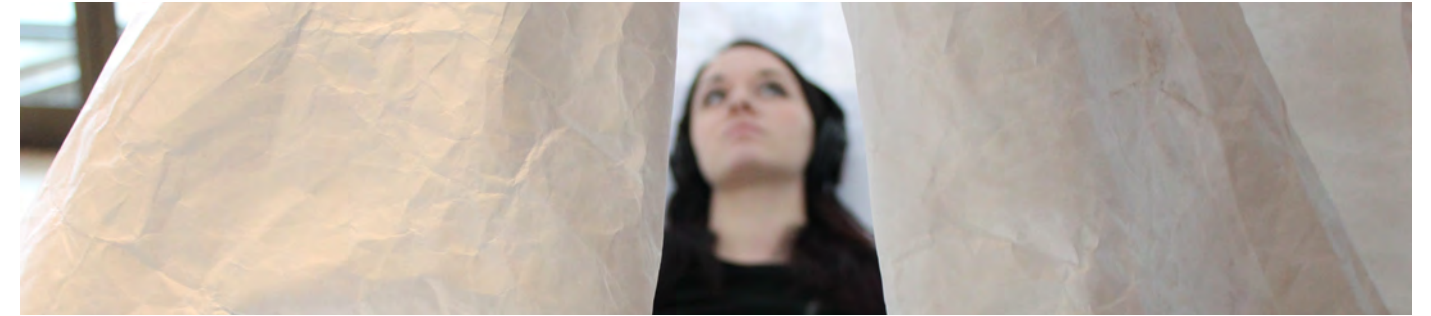


Fig 77 | above. The scissor lift used for installation

Fig 78 | right. The project was well lit at night and during the day



In order to maintain the exact angle required for the mirror at the top of the tent to be visible, the tunnel had to be semi-taut. Once the Tyvek was secured to the metal railing on the second floor, I had to figure out a way for the tent to keep its shape without drilling into the concrete floor. Since I don't throw anything away, the custom steel rod I had made for Dream State ended up being the perfect solution. I cinched the Tyvek around these curved frames and duct taped them to the floor.



“It was very good at interrupting and redirecting flows of thought.”

“...it moves around and sways and it became a flow... like with the music. It was almost like breathing. It was really crazy.”

“So the weird ambient noise was really nice. I kind of got calm and it redirects your consciousness, what you’re thinking about, what the noise is making you think of. So then your memories are racing to other places.”

“This tunnel goes on forever... like I’m in a tunnel of endless fourth dimension-ness. Where am I in space?”

THE INTERACTION

People weren’t quite sure what to make of this odd looking structure. Some approached curiously and had a lot of questions. Others gave quizzical looks and walked straight past. When they entered the giant tent, it was clear what they were to do: sit down. A giant chair and a footrest paints a pretty clear picture. They put on headphones and spent anywhere from 30 seconds to 20 minutes inside the tall tent. Their gaze lifted skyward to take in the long tunnel; the impact of the interaction depended on how comfortable they felt inside this unique environment.



Fig 79 | opposite top left. The approach to the installation: the chair was the invitation to participate

Fig 80 | opposite top right. Participants trying to figure out what was happening at the top of the tent Fig 81 | Participants had the option of closing the tent for privacy

Fig 82 | A test subject holding the Neuma stress test cuff

The Control Group

I commandeered 27 graphic design seniors to be the control group. Because pizza was involved, they willingly subjected themselves to the creativity test. They listed as many alternative uses for this giant white beach ball for 3 minutes, took a 15 minute break in a classroom milieu, and then did the same task again for 3 minutes.

THE CREATIVITY EXPERIMENT

Based on the research I'd done, this built environment had the potential to alter state and since altered states overlap with the creative state, it could increase creativity. Since it was installed at an art school where the population's success is largely determined by creative thinking, I wanted to test if The Solution Space could statistically increase creativity and potentially help my classmates and students.

EXPERIMENT DESIGN & TONY

Tony McCaffrey earned his Ph.D. in cognitive psychology by researching the neuroscientific mechanisms of insight, a key component of creativity. His dissertation focused on techniques to improve creative thinking and overcome "functional fixedness", which is the most common obstacle to solving insight problems. He says "...people fixate on the usual use (i.e., function) of an object which prevents them from coming up with creative uses for the object." This topic directly relates to the experiment we designed to measure the impact of installation art on creativity. Tony was an invaluable resource during the planning stages of the experiment. He helped me figure out how many subjects I would need to come up with

statistically significant results. We worked together to analyze the data and I ended up finding exactly what I was looking for.

EXPERIMENT METHODS

I collected both qualitative and quantitative data to assess whether The Solution Space had any effect on subjects' stress level, state of mind, and creativity.

Quantitative Data

To test creativity, Tony recommended I use Guilford's Alternative Uses Task (1967), a testing method that measures creative fluency and has been used reliably since its inception. Subjects were asked to name as many alternative uses for an object in a 3-minute period of time before and after the experimental manipulation. Guilford's test is an example of a way to overcome 'functional fixedness' by forcing a person to expand upon normalized modes of thinking about an object. When I found an opaque white beach ball in the DMI studio, I overcame my own functional fixedness and saw it not as a beach-time playtoy, but as a stimulator for creative fluency. The manipulation period was 15 minutes during with the control group chatted and snacked in a classroom setting and the experimental group sat inside the Solution Space.

I needed an objective way to measure stress so I chose to measure the biometric of Electrodermal Activity (EDA), a measure of electricity moving on the skin, with the Neuma stress test cuff. As a part of my research, I interviewed Rob Goldberg, PhD, founder of Neumitra, the company that makes the Neuma. I met him at his headquarters downtown and found out how this stress test cuff works:

There are two types of sweat glands: eccrine and apocrine. Apocrine are the smelly ones, eccrine are the stress-related ones. These eccrine glands are stress related because they

are connected to the adrenal glands, the endocrine organ in charge of the fight-or-flight response. When we enter the fight-or-flight response, which Rob says we are in to a slight degree for most of the day, the eccrine glands attempt to regulate body temperature and secrete just a little bit of sweat. This water on the surface of the skin changes the conductance of the skin, which is what the sensors in the Neuma and other stress-test cuffs are measuring.

Subjects were asked to hold the sensors with their first finger and ring finger of their non-dominant hand to increase the accuracy of the reading. A reading was taken for a few seconds before entering The Solution Space to ensure data was being accurately collected via Bluetooth.

Qualitative Data

Each subject was given a paper questionnaire upon exiting the environment. I used a Likert Scale of 1-10 (1= "No, not at all" and 10= "Yes, A lot") and asked subjects to rate themselves on three categories:

1. *Did you notice a change in your state of mind?*
2. *Did you have any new ideas or insights?*
3. *Do you feel less stressed?*

To gather further data on subjective experience, I added a Free Association Task wherein subjects had to write down three words to describe their experience.

Before I ran the experiment, I conducted a pilot study to figure out how long to run the Guilford's Alternative Uses Task. I had 10 coworkers participate and I timed them to find out when they ran out of alternative uses for the same object I used in the actual experiment. Right around 3 minutes, the number of uses people were generating started to drop off. This informed my decision of how long to run the task for. I conducted the experiment on the control group first. With the help of Gunta

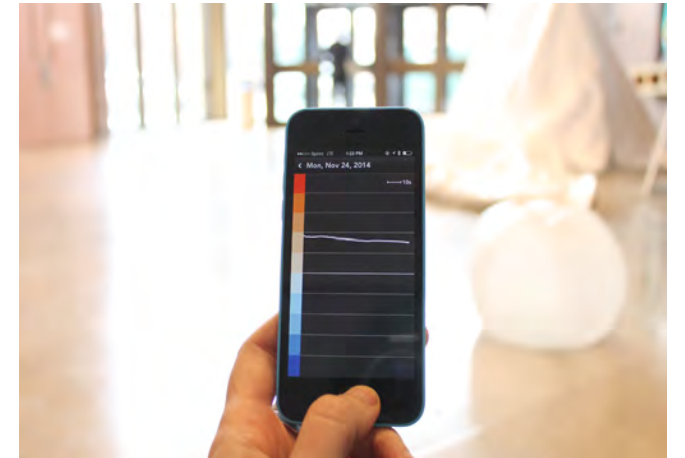


Fig 83 | previous. Administering Guilford's Alternative Uses task to the control group

Fig 84 | opposite. Lists of alternative uses from the control group

Fig 85 | Using the Neuma app to get real time data of participants' Electro Dermal Activity

Fig 86 | Subjective ratings of experience

Kaza, I got our class of graphic design seniors to volunteer during a meeting, and since pizza was involved, everyone willingly subjected themselves.

Recruiting participants for the experimental group took a bit more effort. I made posters, sent out emails and created a Google doc for easy sign-up. Most of the subjects were walk-by volunteers intrigued with what this weird structure was. Most were MassArt students or staff/faculty and had a pre-existing propensity for creative thinking.

EXPERIMENT RESULTS

Qualitative Data

We compiled all data recorded from the paper surveys from 44 subjects. The average score for subjective reports of change in state of mind was 7.5 (sd=2.4), generation of new ideas/insights was reported at an average of 6.0 (sd=2.5), and change in stress level was reported at an average of 7.6 (sd=2.2). Subjects spent an average of 10.6 minutes inside The Solution Space (total cumulative time = 447 minutes). I generated an XY Scatter Graph to compare each category of subjective qualitative experience to time spent in the environment. We found a significant result only when we

compared change in stress level to time (R2=.08). This indicates that the longer a subject spent in The Solution Space, the more they experienced a decrease in stress level.

The Free Association Task resulted in 79 unique words describing the experience: 80% (53/79) were positive, 9% (7/79) were neutral, and 11% (9/79) were negative. The word cloud is based on the number of times each word was used. The top three words reported were: 'calm' (12 times), 'relaxing' (8 times), and 'peaceful' or 'serene' (6 times).

Quantitative Data

The data from the Neuma stress test cuff revealed that 69% of subjects (11/16) experienced a decrease in stress level. This decrease indicates that the manipulation had an impact on emotional stress and may have contributed to the increase in creative thought.

The creativity test results for both 'before' groups were almost exactly the same. The control and experimental groups' means and standard deviations were the following (Control: mean = 12.50 uses, sd = 5.22; Experimental: mean = 12.144, sd = 4.43). Based on a t-test between the two groups, their performances were the same: $t(29.23) = 0.04$, $p\text{-value} = 0.97$. This means that both groups (before the manipulation)

The Solution Space's Ability to Lower Stress over Time

(BASED ON SUBJECTIVE REPORTS, N=44)

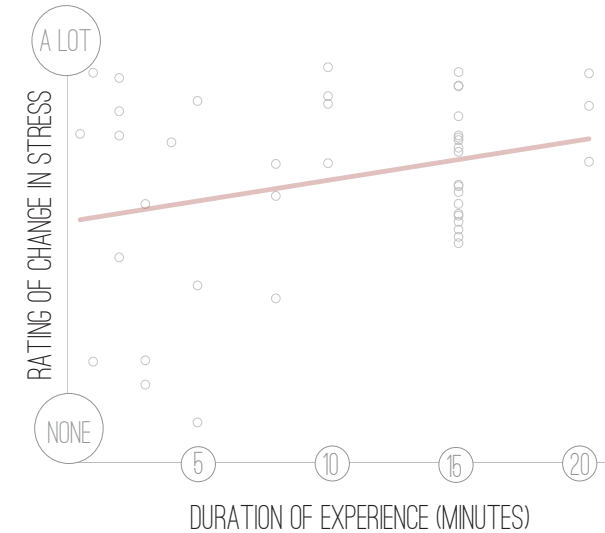


Fig 88 | The more time spent in the Solution Space, the greater the impact on stress reduction

performed similarly on the alternative uses task. The experimental group then spent 15 minutes in The Solution Space tent while the control group engaged in normal activities (i.e., talking/snacking in a classroom). After the 15-minute session, both groups again worked on creating more alternative uses for the same object that they worked on before. The control and experimental groups' means and standard deviations were the following: (Control: mean = 6.88, sd = 3.26; Experimental: mean = 9.38, sd = 2.58). Based on a t-test, their performances were statistically different: $t(28.48) = 2.40$, $p\text{-value} = 0.02$. Because the p-value is less than the standard cut-off for statistical significance (0.05), this experiment provides evidence that the The Solution Space leads to the creation of significantly more alternative uses for the object. The experimental group produced 2.5 more alternative uses than the control group ($9.38 - 6.88 = 2.5$ uses), which is a 37% improvement in performance ($2.5/6.88$).

Spending 15 minutes inside The Solution Space caused a 37% increase in creativity.

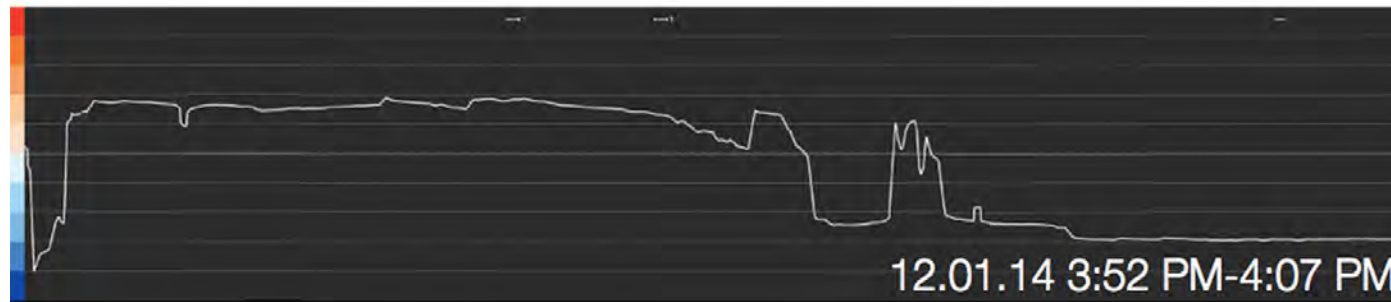


Fig 87 | above. Data from the Neuma stress test cuff over a 15 minute period revealing a reduction in Electro Dermal Activity, a measure of stress level

CHAPTER

FIVE

 CHANGE IN PHYSIOLOGY

The pace of modern living has conditioned us to perceive the minutiae of daily life as more stressful and threatening than they actually are.

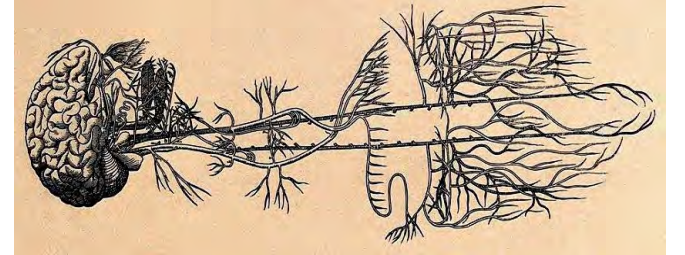


Fig 91 | An early interpretation of the Vagus Nerve

Changes in physiology happen every second. The changes I am most interested in are those that are both consciously controllable and habitual. One physiological behavior that rarely breaks into our conscious awareness and meets both of these requirements is the simple act of breathing. You've likely read this far without being aware of your body moving with the tide of your breath. You've likely not taken a full deep inhalation since you started reading. Breathing is one of the only physiological functions that is both voluntary and involuntary and it is the only part of the Autonomic Nervous System that is consciously controllable. Because it has such a powerful effect on our state of mind, neurochemistry, and well-being, it is the best physiological function to explore with interactive art design.

THE VAGUS NERVE

In 1965, Harvard researcher Herbert Benson wrote "The Relaxation Response" and simultaneously coined the term for this physiological phenomenon. The Relaxation Response is the opposite of the Fight or Flight response, which kicks in during emergency situations to keep us safe from harm. Unfortunately, this fight or flight response, is almost always in some state of arousal. The pace of modern living has conditioned us to perceive the minutiae of daily life as more stressful and threatening than they actually are.

This makes the stimulation of the Relaxation Response even more critical. The fastest route to turning off the fight or flight response and turning on the relaxation response is by stimulating the vagus nerve. This lifeline of nervous tissue runs straight through the diaphragm and is stimulated every time we take a deep breath in, causing the diaphragm to contract. As soon as the diaphragm hugs this nerve, physiological goodness ensues.

Additionally, the FDA approved a device for treatment-resistant depression that stimulated the vagus nerve via an electrode implanted in the necks of patients. Known as VNS, or “Vagus Nerve Stimulation” Therapy, this surprising form of mental health treatment has a well-researched track record and gives credence to the job of the vagus nerve in regulating neurochemistry. This body of research informs the design of my physiology-changing projects and has also had an impact on other artists work.

Another artist who has broached the topic of breathing and fused it with the process of art-making is Aaron Levine. A professional furniture designer and builder, he has a line of furniture that are sculptural works of art while retaining household function. His recent piece, “The Utility of Breath”(2012), is an exquisitely crafted cabinet with two doors that mechanically open and close slowly and slightly, mimicking the movement of breath. His work is more of a commentary than an interactive work; he states: “We take breathing for granted unless, of course, it ceases. A cabinet that breathes was designed to startle and provoke the observer into an awareness that goes beyond immediate perceived utility.” The connection to the breath is understood through reading this description of the kinetic furniture or when you get the guided tour at Bellevue Arts Museum in Washington.



Fig 92 | A guide at Bellevue Art Museum explaining Aaron Levine's *Breathing Cabinet* (2012). Photo courtesy Richard Keen

The Benefits Of Stimulating The Vagus Nerve:

1) Acetylcholine release

ACH is a powerful neurotransmitter needed for learning and memory

2) BD Neurotrophic Factor increase

Miracle Gro for brain cells required for neurogenesis

3) Cortisol level decrease

too much cortisol (stress hormone) disrupts circadian rhythms, creates an overly acidic pH, and lowers immune function [Thiese]

CS04

CASE STUDY 04
Real Time Clocks

PERSONAL VIGNETTE

I was lucky enough to watch my mom take her last breath; she died of lung cancer recently, just after Christmas, her favorite holiday. After watching and listening to her struggle to breathe for weeks, it was almost a relief. Huddled together by her bedside in the family room, my dad, my sister and I watched her last exhale peacefully leave her body. It was in those sacred and quiet moments right after she died that I became acutely aware that each breath we take in has a number on it. Only when we approach the inevitable end do we notice the presence and quality of this apparently simple function. It is the absence of function that most potently improves our appreciation for the presence of function.

It's hard to not include a vignette about my dear mom, since my first art project upon returning to Boston after Christmas break was about the thing that killed her: the ability to breathe. However, the roots for this project go back to my first semester at DMI. I collaborated on a project, *Deep Breath Developer* with my classmates, Ceren Paydas and Sophie, which resulted in a visual and physical experience of breathing at the proper rate. There was a video of a woman (me) practicing this ideal 'deep breath', which translates to 5-7 breaths per minute, in comparison to the normal breath rate which is twice that: 10-14 breaths per minute.

I designed the visual component of the interaction based on the common social behavior, "mirroring". Mirroring is exactly what you'd expect: we often unconsciously copy the body language, gestures, and even speaking style, of the person we are interacting with. I made a video of myself, a 20 second selfie, breathing at the proper rate. I forecasted that people would alter their breath rate to match that of the woman on screen. The physical part of the design was a giant pillow suspended from the ceiling. As the participant inhales,

the pillow expands outward, and as they exhale, the pillow contracts inward, giving a soft mechanized hug. The physical sensation and visual stimulation were synced, providing the participant with a major dose of breath rate entrainment. Since this was only a prototype for class, we never tried out our project on the public, but the idea behind it stuck and carried through to *Real Time Clocks*.



Fig 93 | A video experiment with "mirroring" to help people breathe at a deeper rate

It is the absence
of function that
has the strongest
influence on our
appreciation for
the presence of
function.

Real Time Clocks

"Boston Does Boston" **Proof Gallery**. Feb 2015
 "Fresh Media" **Cyber Arts Gallery**. May 2015

Combining the experience with my mom and with my classmates, I embarked on the design and production of the **Real Time Clocks**. These were clocks that displayed the difference in the two breath rates we'd explored with the **Deep Breath Developer**. I wanted to demonstrate the difference to educate the public about the disparity between normal breath rate and the most beneficial breath rate. The provision of this information might be helpful in delivering the message and inspiring the behavior change.

GOALS

To inspire the public to slow their breath rate down and to encourage the onset of the benefits of deep breathing.

MATERIALS

Masonite, acrylic paint, DC gearhead motor, neon



DESIGN CONSIDERATIONS

Existing Architecture

The participants were gallery visitors and the experience had to adhere to the box-like indoor structure of Proof Gallery in South Boston. The walls were drywall which impacts the hardware needed for hanging.

Existing Light

My piece would be installed next to Derek Hoffend's interactive installation which emitted a low level of LED light. The area we were in was separate from the rest of the gallery so we had complete control over lighting.

Human Factors

I carefully considered where the disks were hung in relationship to each other and to the direction of participants' gaze. Participants had to comfortably see the spinning hand of each disk or clock at a distance of 3-5 feet, based on the layout of the space. Each clock was experienced separately to provide two distinct experiences of the different breath rates.

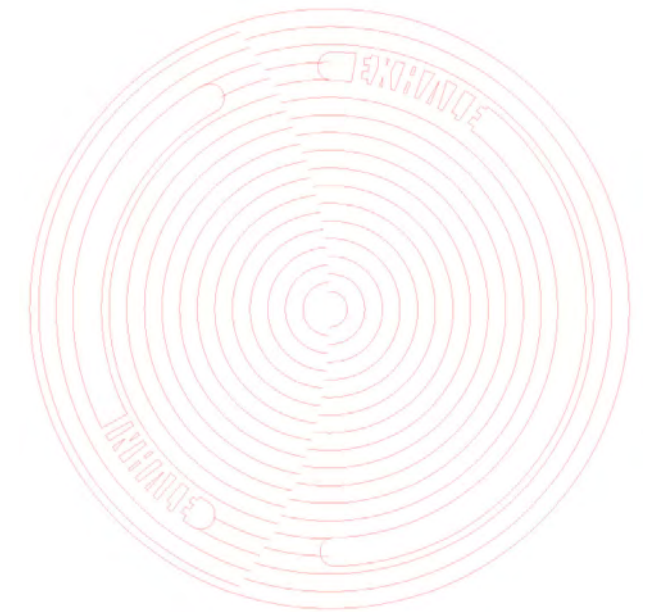


Fig 94 | opposite. Power pink acrylic paint

Fig 95 | top. DC Gearhead motor used to spin the clock hands at 14 rpms

Fig 96 | above. Illustrator .eps file for the laser cutter

DESIGN

I harnessed the trusty power of 2 DC gearhead motors to spin the clock hands around at the proper rates, which I placed at the middle of each clock. Since I've always wanted to create a project involving the 'power pink' pigment, I painted each disk two different hues of this charming color. The less saturated pink disk demonstrated a rate of 14 breaths per minute, which is an average rate for a person at rest. The saturation level of the paint was a conceptual reflection of the blood oxygen saturation rate induced by each clock. The deeper the breath, the more saturated the blood. To contribute to the sense that each disk had a life of its own, I included a neon lighting element to make the disks glow from within.

THE INTERACTION

Feedback gathered at both openings was altogether positive. The interaction was very clear and participants intuitively understood where to stand and what to do. A number of people recommended I patent the idea, mass-produce and sell the clocks. A friend texted me days later; "I'm still thinking about my breathing!"



Fig 97 | Jack Mills approaching the art

Fig 98 | A gallery visitor taking a video to send a friend

TAKEAWAYS

- Projects that take a few days to design and execute can be just as powerful as those that take months. This was a quick and relatively smooth process, unlike Dream State, a process wrought with upheaval and rejiggering.
- The design language of a 'clock' is universal and the English language is also universal, but there was at least one person who did not understand what "inhale" and "exhale" meant. There was no way around this; using a graphic to communicate breathing did not make good design sense.
- The drawback of using neon, as stated previously, is the giant black power cords. In the next iteration I plan to occlude the cords completely. At Proof Gallery, about an inch of the cord was visible between the disk and the cord cover. Just — a minor detail, but visually important.

CONCLUSION

Each occasion that I showed this work garnered similar feedback. I was encouraged to commercialize this kinetic sculpture as a product. The feedback was a resounding I WANT ONE and I am considering patenting this concept and also looking into making a wrist-watch version. The design was simple and people intuitively knew what to do without instruction. Perhaps its the simple physicality and mechanical nature of the experience that makes it so appealing. I came to this conclusion only after learning what the non-physical, screen-based version of this experience was like, in the next case study.



CS05



CASE STUDY 05
TinyVacay.com

TinyVacay.com

online

Warning: *This is not an art installation but a website that attempts to achieve the same behavior changing goals on a platform accessible to the masses.*

The reparations made to our psychological and physical well-being while on vacation are unparalleled. The ability to get away from it all allows us to unwind and get out of the normal and often mind-numbing routines of modern living. People take vacations because they are stress-busters; gone are the deadlines, the to-do lists, the banality of the same-old same-old. Unfortunately, the effects of taking a two-week vacation usually wear off after a week [Jabr]. The effects don't last because people return to their normal life and take on all the old habits and routines. In order for a more durable and long-lasting stress-reducing experience, the benefits of taking a vacation have to be seamlessly incorporated into daily routines.

GOALS

To provide an easily accessible experience of stress-reduction that can be incorporated into the daily routine and hopefully habitualized.

MATERIALS

the Internet



DESIGN CONSIDERATIONS

Existing Architecture and Light

This is a web project; the Internet does have an architecture of sorts and LCD screens certainly emit plenty of blue light. Most websites are full of information: advertising, pop-up windows, even nav bars can get cluttered. This project is designed to be the antithesis of the average website. It will be a sensory deprivation, not stimulation experience that will promote an improvement in breathing and reduction in stress level.

Human Factors

The participants for this project were a new crowd to design for, because anyone with an Internet connection or a smartphone can access Tinyvacay.com. We considered why people might visit this sight and what exactly is the motivation to relax.

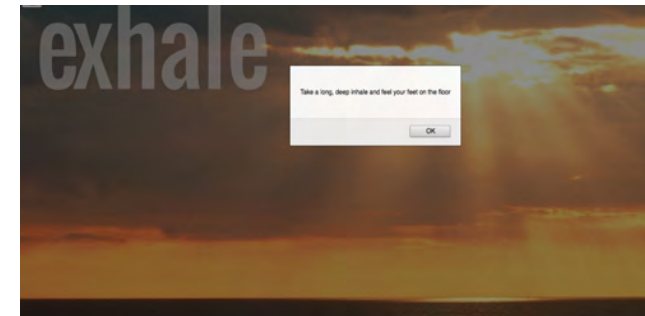
“Multiple stimuli create competing neural representations, mutually suppressing the visual cortex and related faculties, resulting in limited processing capacity.”

Princeton University Neuroscience Institute

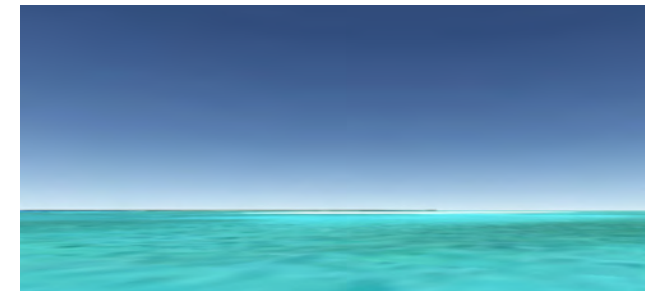
DESIGN

Tiny Vacay was designed to tap into the ‘get out of here’ drive while rewarding tiny vacationers with a new frame of mind. A mini-trip to a fantasy destination of your choice through the flat screen of your laptop makes the web an ideal platform for this easily accessible experience. The physiological rewards of deep breathing and brainwave entrainment are woven into the platform as ‘features’. The UX design mimics the process of booking a plane ticket and aims to provide a similar thrill. The true function of Tiny Vacay is in opposition to the apparent function, since it takes you on a slow trip through your destination (providing the escape) but also brings you into the present moment via the vehicle of your breath. The escape is an entrance into a new more relaxed you. It’s a meditation app in disguise.

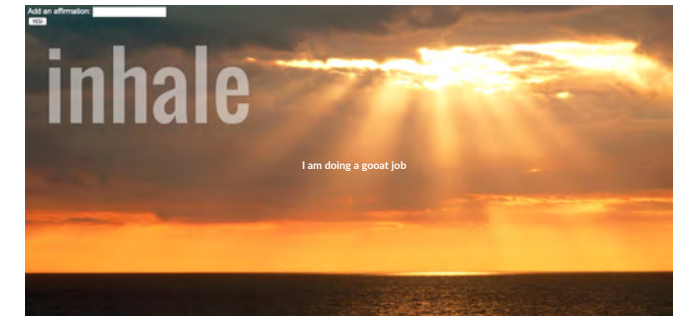
Taking a ten-minute break at your desk pales in comparison to a full-blown getaway, but it can potentially aid in the process of unwinding and keeping stress levels at bay during the day and in the very environment which causes so much distress. Regular tiny vacations can also have a real impact on the wiring of the nervous system. A longitudinal study of breathing practice at University of Wisconsin showed that regular interventions, similar to the breath-rate altering experience on TinyVacay.com, can have a positive impact on highly stressed individuals, specifically veterans with PTSD. Short ‘trips’ where the breath rate is optimized to less than 7 breaths per minute, taken daily, could potentially have lasting effects on how we manage stress. Taking a vacation is a fantastic solution, and taking a tiny vacation is an accessible and long-lasting solution.



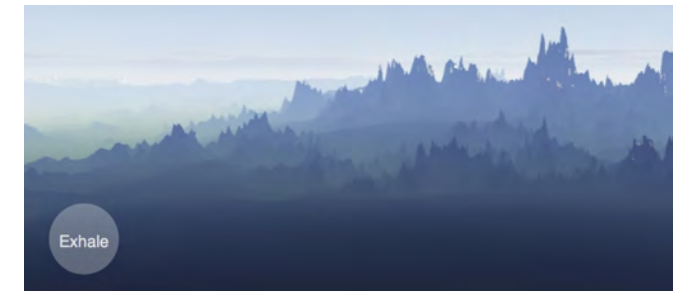
Iteration 1. Upon entering the site, a pop-up window tells you to “Take a long deep breath and felt your feet on the floor.” The inhale and exhale are really big and move up and down on screen. The nature scene with a horizon line was included based on research showing that this perception of great distance has the effect of changing perception of time.



Iteration 3. Another idea was to create the actual experience of traveling, to take a faux journey. My fantasy was to use google maps to send the tiny vacationer to their destination of choice, but the complexity of this programming was prohibitive.



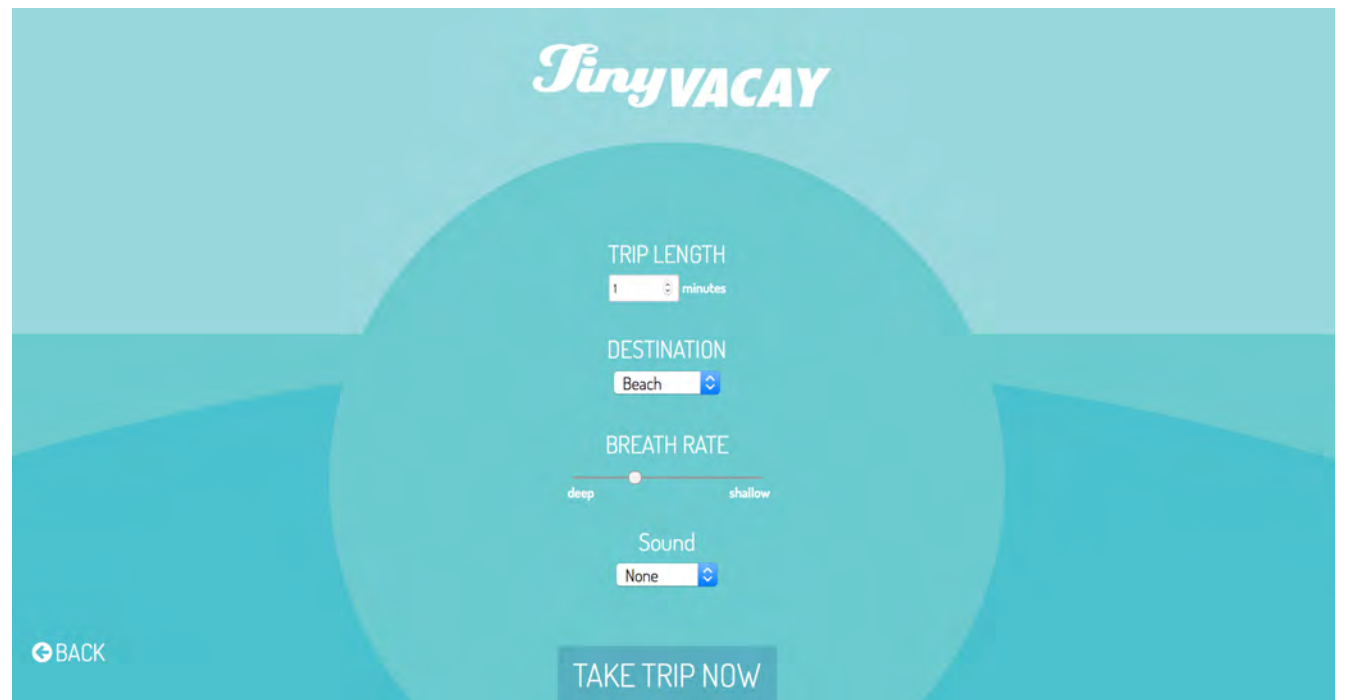
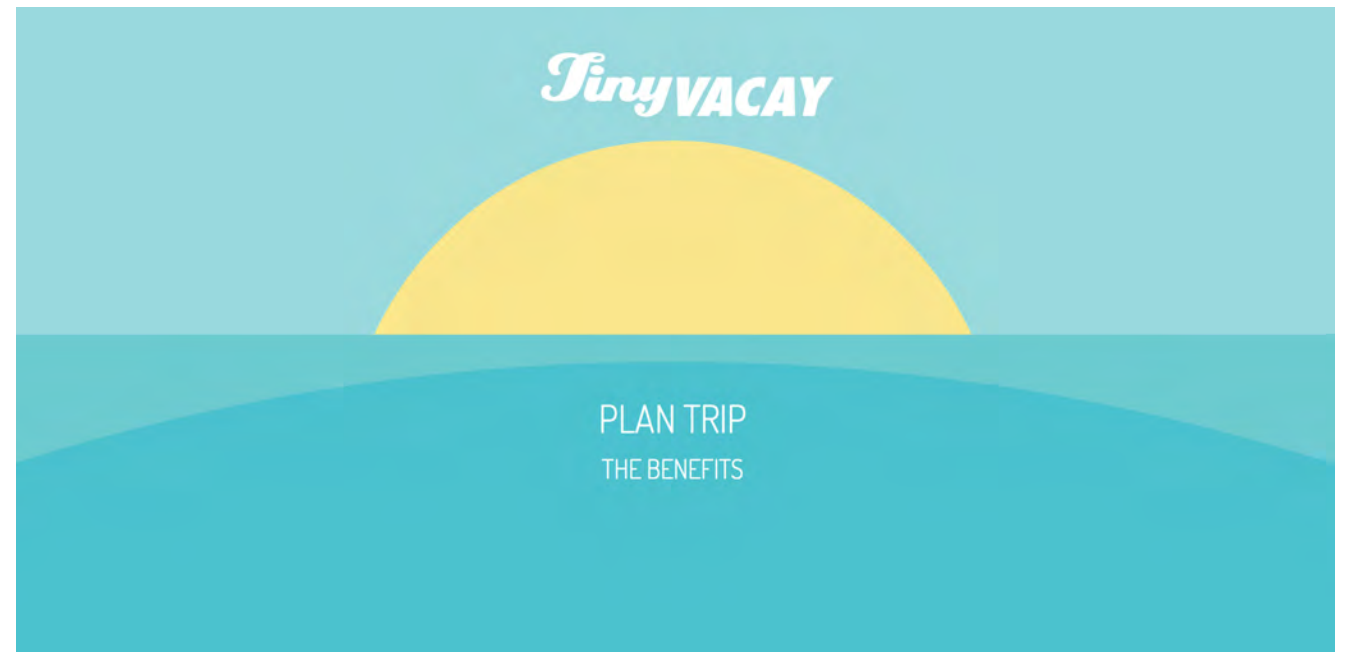
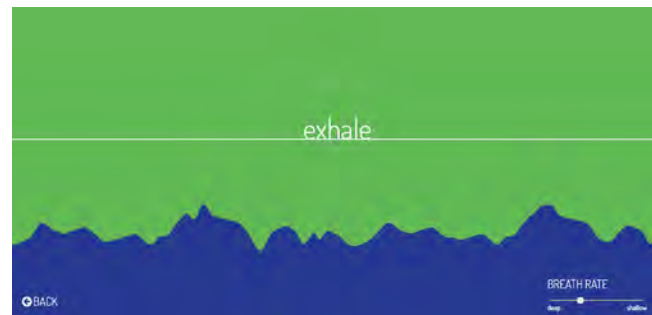
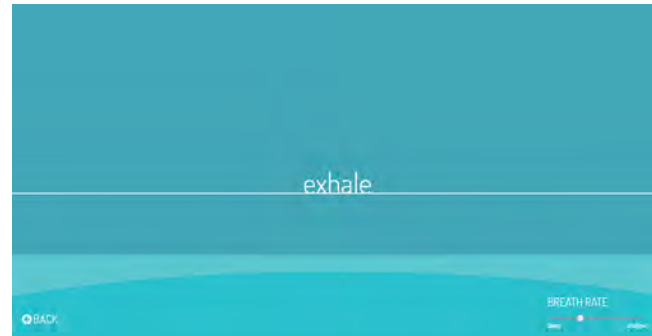
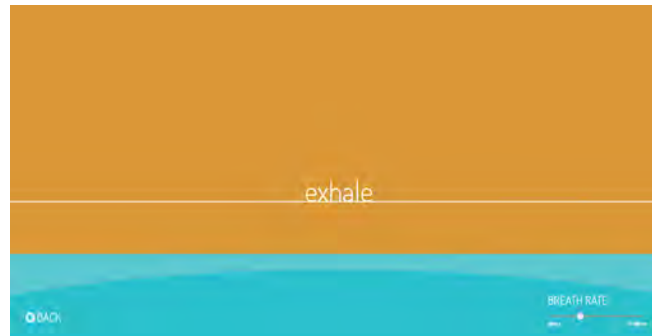
Iteration 2. There was a text box and a submit button in the top corner to add an affirmation that would appear in the center of the screen. This was a cognitive behavioral therapy technique: replacing negative thoughts with a positive thought. The affirmation component got scrapped for the sake of simplicity.



Iteration 3. We changed the large text moving up and down to a circle growing and shrinking with the breath. Feedback proved that this was not relaxing and the positioning on the bottom corner was also not scoring any points.

I wanted there to be a visual cue of the passage of time so that participants would know that something is happening. The background color slowly changes and loops every 60 seconds. Each "destination" has its own color palette to provide various options depending on preference. There is also a pull-down menu to add sound, the binaural beat program to assist entry into a relaxed, meditative, or focused brainwave state.

Fig 00-00 | below. The three destinations and their color palettes
 Fig 00-00 | opposite. The homepage and the Plan Trip page



During a DMI workshop for our Fresh Media show, Andrew and I learned a few things about the interface design. We had to add the “Breath Rate” slider to each destination page in order for people to adjust their personalized rate as they got used to the new physiologic behavior.

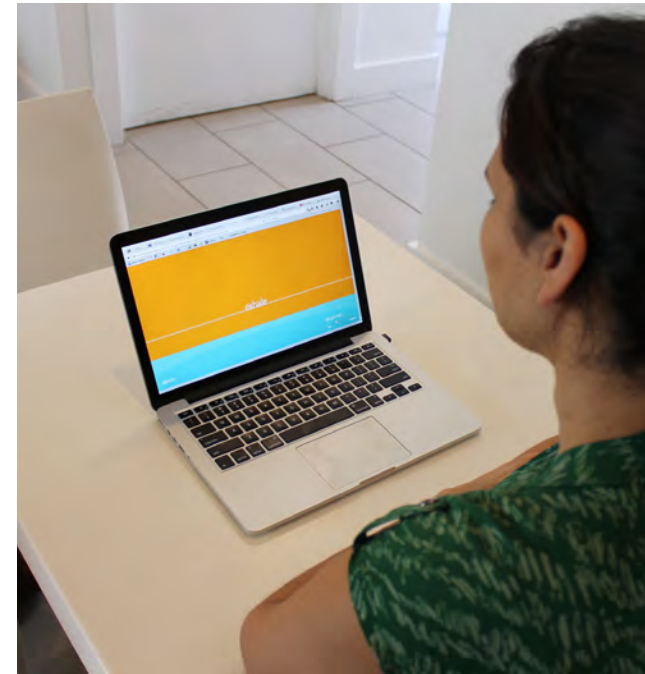
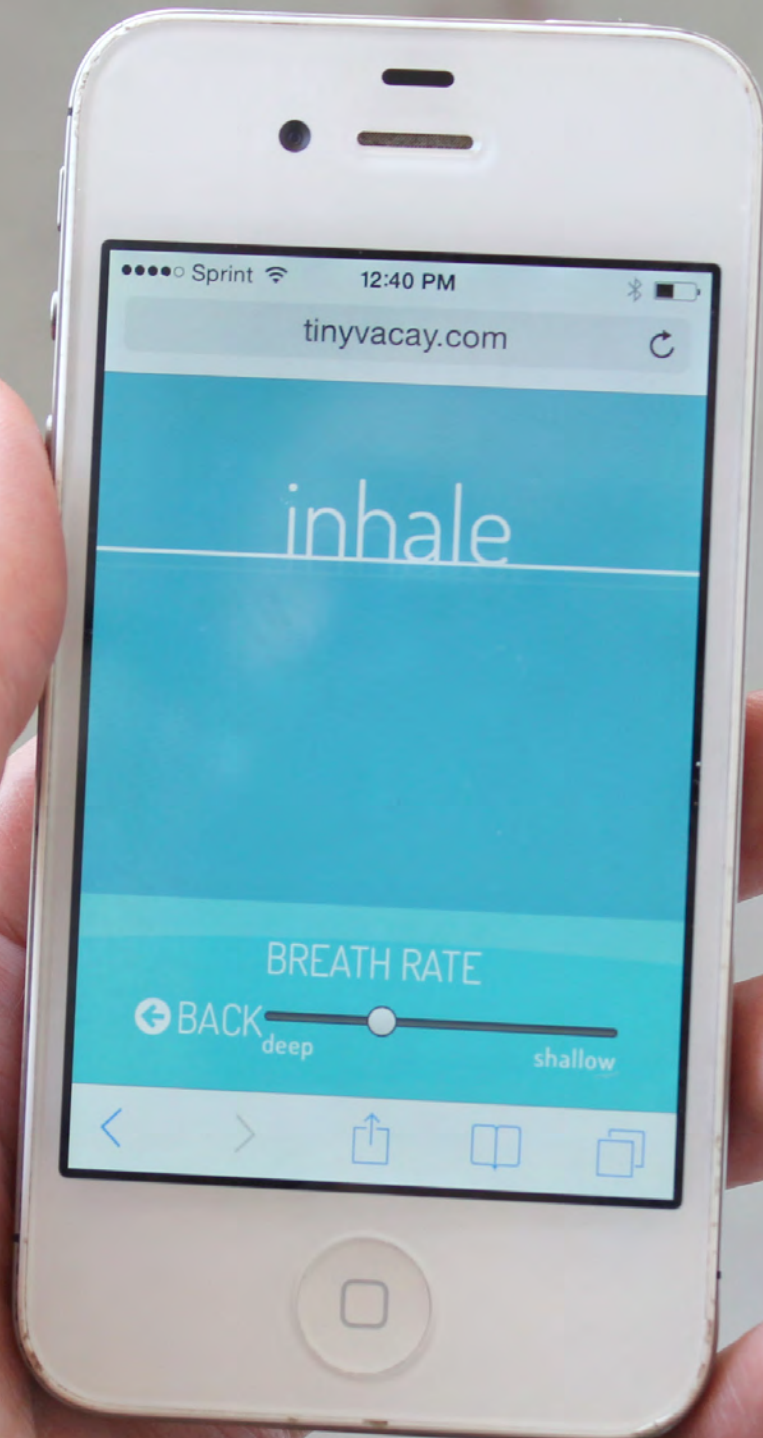


Fig 99 | And Maria Torres Angarita takes a Tiny Vacay at a cafe

CONCLUSION

One of the more satisfying parts of making art is seeing it in its final incarnation, up and running. Although this project was a lot more fun to design, it wasn't as satisfying to experience the experiencers. The process of designing an interface with a precise goal was the best part of the project. We made decisions and revisions countless times based on our own design skill and our peers' and teachers' feedback. Because I have a background in graphic design, developing the color palette and the graphics was an added bonus and seeing my idea manifest on screen was rewarding. However, I didn't really get much out of observing participants and I don't think they got much out of the experience. It was a novel gesture, but I don't think the concept in the digital world is as compelling as the physical world, as demonstrated by the Real Time Clocks.

If a person goes to the TinyVacay.com once, they've learned what it does and how it functions. If they had a good experience, they likely will not go back again because the novelty has worn off. Watching a line rise and fall against a shifting colored background is not enough of a draw to be a repeat experience. Whenever I think about taking a Tiny Vacay, instead of going to the site, I just imagine the interface and slow my breath down on my own, sans visual aid. Sadly, TinyVacay.com, although not meant to be a meditation app, fits in to the common fate of most apps on my tech devices: it gets dragged to the trash.

TAKEAWAYS

- Unsurprisingly, designing for virtual space is a radically different experience than designing for physical space. There's a lot of graphic design involved; color palettes and font choice become much more important.
- This project would never have made it to the world wide web without the programming wizardry of Andrew Ringler. Collaborating on a web project was much more gratifying than if I tried to struggle through on my own.

CHAPTER

SIX

 CHANGE IN CULTURAL HABIT

“The community arts are particularly influential in developing pro-social behaviours and altruism.”

Gay Hawkins



Fig 100 | Simon Moretti. **A Space For Conversation.** 2012

Antanas Mockus, mayor of Bogota, Columbia from 1995-2003, is a well-recognized agent of behavior change, specifically in the public sector. During his leadership, Bogotá transformed from a desperate city where traveling was synonymous with flirting with death into a functional and safe urban center. “He focused on changing hearts and minds by empowering citizens as individuals and getting people to think about good and bad behaviour.” [Bradt]. His many successes were not achieved by ramping up the policia or giving heart-wrenching speeches, he did this by deploying artists.

Since so many deaths were vehicular homicides, he had 1,500 stars painted on streets where people had been killed in traffic accidents. This rogue act of street art resulted in a 50% drop in traffic fatalities the following year [Sommer]. This visual art form transmitted information to the public that was not readily within their scope of awareness. If the public is unaware of the effect of their actions, in this case, careless and aggressive driving behavior, then change to the harmful actions cannot occur.

Aside from educating people about their behavior and its impact, art and design can also generate new behavior with pro-social influences. Simon Moretti’s “A Space for Conversation” (2000) was a simply designed installation that altered the public’s communications and “...created an intimacy in a busy thoroughfare” [Oliviera]. Participants were invited to communicate only with paper and pencil and only in drawings while seated on giant circular carpets. Through this improvement on floor design, he transformed a transitional space into a destination and generated a new public behavior by disrupting habit for participants who were willing to step outside their comfort zone. The public now had a space to stop and sit; these round destinations upon the floor were fertile ground for dialogues with strangers, for exchanging thoughts in an unexpected scenario. Without knowing it, participants were interrupting habitual behavior and therefore diversifying their neural pathways.



Fig 101 | Antanas Mockus. Mayor of Bogota, Columbia 1995-2003. During his tenure, Mockus pressed the limits of social norms for public officials. He often dressed up as Super Citizen to inspire the public to fight to improve their lives and the environment.

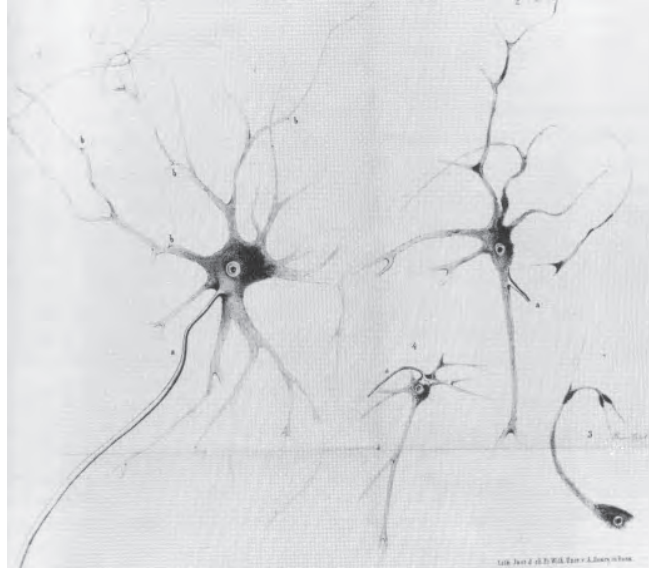


Fig 102 | top. Neurons under an electron microscope

HABIT CHANGE

On a neurological level, the more times we do the same thing the same way, the stronger the neural pathway becomes. If you can harken back to Psych 101, a neuron (brain cell) is comprised of two basic parts: the axon and the dendrite. A neural pathway is formed when the dendrite of one neuron connects to the axon of another neuron, and the winning connection is made. These cerebral trail systems are just like what we find in the woods. The more we tread on the same path, the easier it is to travel down. This applies to nerve impulses as well.

Habits have their own cerebral trail systems and leave the rest of our heady territory undeveloped and underutilized. Every time we disrupt a habit, or even simply move our body in a novel way, a new neural pathway is formed. This is also a sensible explanation of the downside of aging and why old people are “set in their ways”: as years go by it becomes harder to disrupt and variegate neural wiring. Fortunately, under the large umbrella of neuroscience is the blessing of “neuroplasticity”, an area of research proving that nothing is set in stone inside the cranium. “Brain plasticity implies that with the right effort and the right influence, we can make ourselves smarter to some extent, that we can enhance our creativity, and that the brain, as a living organ, neurologically changes over time.” [Mallgrave]

Thankfully we are not at the mercy of habitual behavior. Through will alone, we can make improvements to our neurological functioning. A decision as simple as walking to work along a new route can do wonders for neural circuitry. Bringing conscious awareness to each moment of decision making is the key. Throughout a lifetime of deciding and habit forming, the less default behaviors we exhibit, the better our brain health.

“Habit is a choice that we deliberately make at some point, and then stop thinking about, but continue doing, often every day.”

Charles Duhigg

CS06

CASE STUDY 06
The Speed of Gestalt

The Speed Of Gestalt

Space Gallery, Portland ME. June-July 2013.

The culture of New England is much faster paced and more rigid than anywhere else in the country. After living far from my home base for ten years (Oregon, California, Colorado and Costa Rica), I returned to the eastern seaboard with a new perspective on membership in my east coast community. Maybe it's the puritanical roots, the population density, the over-identification with accomplishment, or maybe it's just the cold weather, but Boston city streets are not a place for stopping and chatting with passersby.

The culture out there is such that most folks don't even make eye contact. Walking from point A to point B is a fast paced, destination-focused activity. The popular frenetic rush exhibited by pedestrians prevents the acknowledgement of each other and our surroundings. I posit that speedy-street-trekking is a learned behavior and can be unlearned if we have reason to reposition ourselves within this context. A good reason to reposition is an engaging piece of art, one that grabs our attention and inspires us to disrupt our unconscious habitual behavior.

PROJECT GOALS

To disrupt the habit of walking quickly down city streets and to inspire pedestrians to stop and notice what they are walking past.

MATERIALS

String, pegboard, incandescent light

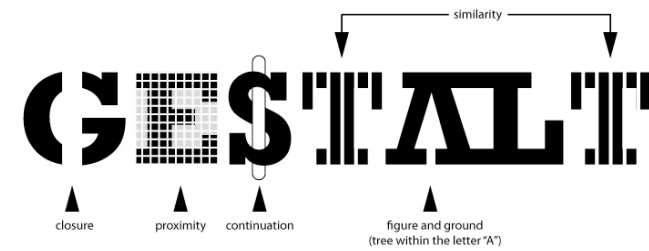


Fig 104 | *The Gestalt Principles*

DESIGN CONSIDERATIONS

Existing Architecture

The front of Space Gallery consists of a wide bay of three windows. The window frame was narrow but might interfere with the experience of the installation. Because I was harnessing the Gestalt principles of proximity, similarity, and continuation, the entire visual experience of the piece had to be uninterrupted by architecture. The frame was a slight concern in the beginning, but did not have a prohibitive effect on the visual perception. The space was 15' wide by 8' tall and 3' deep and I designed the piece to fill the entire window.

Existing Light

The natural light filled the space effectively during the day and illuminated the installation without need for extra lighting. I chose low lumen lighting (not too bright) for the evening and night time hours. I wanted the quality of light to be warm and welcoming and be more of an even glow so that the source of light was not obvious.

Human Factors

The installation was designed for Portland, Mainers walking past the gallery. Since I wanted to disrupt habit, I wanted to make sure people would have reason to stop and investigate the contents of the window, but I didn't want it to be garish or alarming. I considered how people walk and the angle of their gaze. I also considered how the piece would look from all angles and from a distance so that it drew people in from the other side of the street.



Fig 105 | *Organizing technique for 2,592 strands of string: the twist-n-tie. Photo courtesy Emily Straubel*



Fig 106 | Conrad Bakker. **Relax and Take Your Fucking Time**. 2010-12.
Another work of art that uses signage to inspire a slow down.

DESIGN

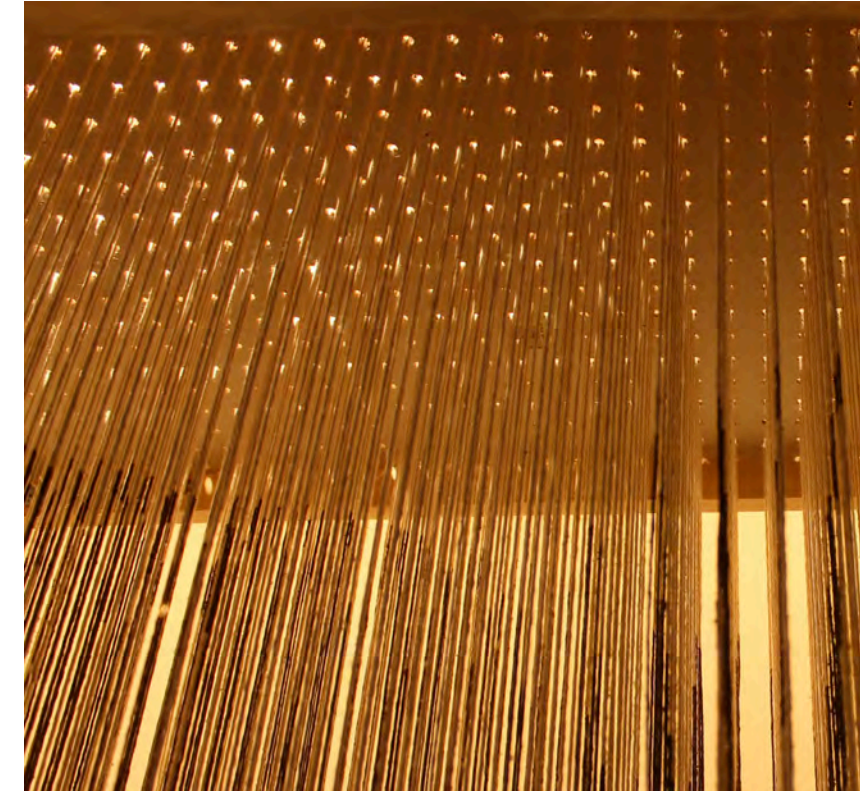
Effective signage to direct behavior is nothing new. I wanted to create a sign-reading experience that intersected with the behavior change I was attempting to evoke. Similar to Bakker's "Relax and Take Your Time" sign, but with the added experience of actually relaxing and taking your time in order to perceive the sign.

In order to cause this physical slow down, I deployed the principles of Gestalt, our perceptual tendency to organize groups of individual objects into a larger whole. When we tease out the one object, the meaning of the whole gets lost and loses impact, but when we see all parts as one unified system, the message is conveyed. The individual parts in the project were 4' lengths of household cotton string, and the unified whole was a 15' wide x 2' deep string grid.

I painted my message: "SLOW DOWN" on the grid and at this size, it took a few seconds to walk past. The letters are imperceptible when viewed while walking past at a fast clip but are legible when walking slowly (from left to right only) and from a particular angle. I took

advantage of one of the main thoroughfares in Portland: Space Gallery's front window on Congress St.

I picked a serif font because the presence of serifs aids in identifying a random shape as a letter. I got the size just right by projecting the Illustrator file onto the grid of string at the exact angle of the average pedestrian's eye gaze. Production was quite the endeavor. Luckily I had a group of friends help with the string grid-making. The painting process was a one-woman show involving a projector, acrylic paint covered fingertips, and 10 episodes of Radiolab. I tied off the sections of string and painted the projected outline of the letters in long horizontal swaths. The color was also an important facet to the experience. Full spectrum displays (meaning all colors of the rainbow) are more stimulating and draw more attention than monochromatic displays. I wanted to start in red and have the letters follow a smooth gradient into blue.



INTERACTION

The illusion of the letters appearing and disappearing is what caused the desired behavior change. People would walk past, notice some kind of pattern in the strings (a serif, an edge of a letter) and then back up to double check themselves. Once they detected a letter, they stopped and walked past until they figured out what was being spelled. This installation succeeded in causing pedestrians to slow their pace and interrupt their default behavior. There was a big disparity between the appearance of the installation during the day and night. The message was more effective during the day, since the natural light made the letters more visible. The rectangular grid was more effective at night due to the source of light shifting from outside to inside.



MATERIALS MISSION

Creating a giant grid of string was no cinch, but by using the ready-made grid system of pegboard, the project became simplified. After I tested a prototype, letting the string hang was clearly not an option due to tangling. The strings had to be put in traction, otherwise this vision would not materialize. With the generous help of my Maine friends, particularly Patrick Roche, we sandwiched two boards together and wove the string through. Feeding one string through one hole was the obvious route, but we decided to thread one long string two holes to get two lengths of string strung at a time. The sandwiching came in handy when we had to install. We very carefully pulled the boards apart and the bottom pegboard acted like a comb, stretching the 2,952 strings into an precisely aligned grid. Thanks, pegboard and friends.

TAKEAWAYS

- Think about every tiny step in production before starting production. The way we tied off the sections of string did not work well with the way I had to untie the sections to paint the rows of string in a sequential fashion.
- Double check all measurements. The gallery director did not have the dimensions of the space exactly right and when I went to install, there was 3 extra feet of horizontal space unaccounted for. It worked out fine, I just had to get more fabric to fill in this area.
- Plan on everything taking twice as long, especially if you are working in a new medium. Painting 2,592 pieces of hanging string with precision is not a speedy operation.



Fig 107 | top. Walking up Congress St., reading left to right

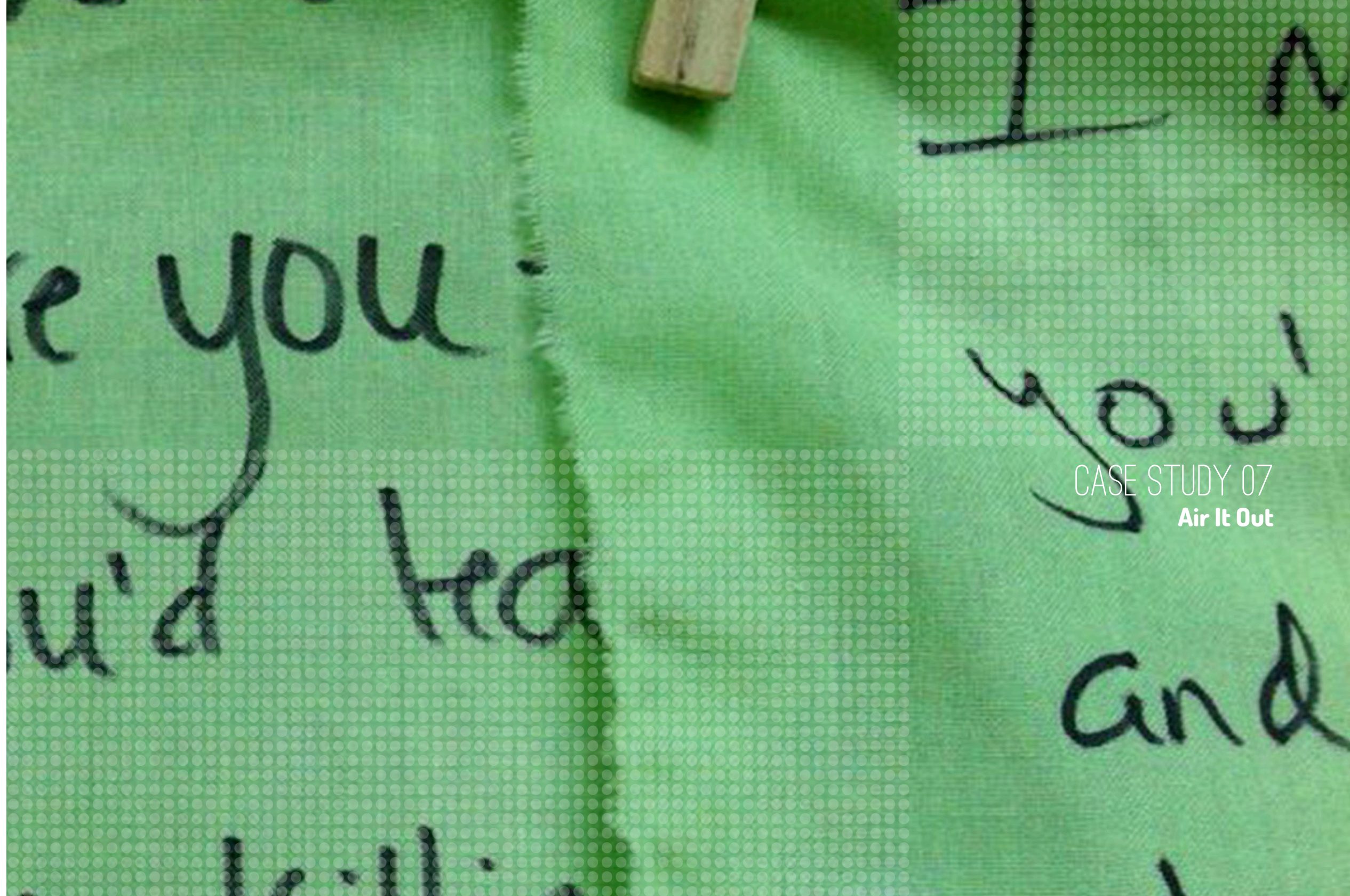
Fig 108 | left bottom. Walking down Congress St., reading right to left

CONCLUSION

The Speed of Gestalt pinpointed a very specific and observable behavior. Many of my prior projects intended to create a shift in more subtle behaviors that were conveyed only through subjective reports from participants. This was different. People responded more obviously: I could see from across the street who 'got it' and who didn't. Nobody started walking slower for too long after they saw the message, but their routine ramble down Congress St. was definitely interrupted. I think its these little interruptions in the day that give us a little more mental room to appreciate what is happening around us.



CS07



CASE STUDY 07
Air It Out

Air It Out

FIGMENT, Governor's Island, NYC, June 2013
Rose Kennedy Greenway, Boston, August 2013

An apparently pro-social behavior is being 'socially acceptable', a behavior that can result in a lot of tongue-holding. There are countless occasions in our culture involving thought censorship for the sake of protecting feelings, saving face, or avoiding incrimination <not parallel with the others, just to name a few. Do these internal rumblings have a deleterious affect on our mental health? Are there secrets and sentiments deeply rooted in our unconscious that we'd rather keep there? What would happen if the public was given an opportunity to let it all out and liberate themselves from what we commonly refer to as "dirty laundry"?

This project came to fruition in response to a call for proposals for FIGMENT, an annual arts festival on Governors Island, a tiny water bound plot of land between Manhattan and the Statue of Liberty. My friend Alex Kelly approached me for a collaborative project combining both of our interests. She was interested in public story telling, and after conversations about the aforementioned questions, we sat down, proposed, and months later, were accepted into the festival.

PROJECT GOALS

To encourage the public airing of grievances and provide an easily accessible platform for participants to relieve themselves of the weight of the unsaid. To create a large display of dirty laundry as a visual representation of our collective inability to express ourselves.

MATERIALS

Fabric, plywood, rope & PVC pipe

DESIGN CONSIDERATIONS

Existing Architecture

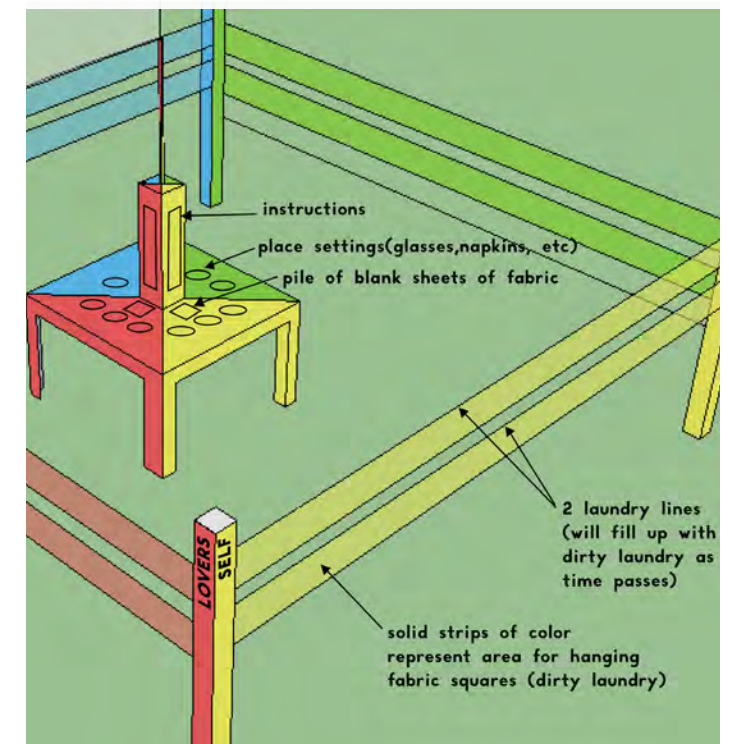
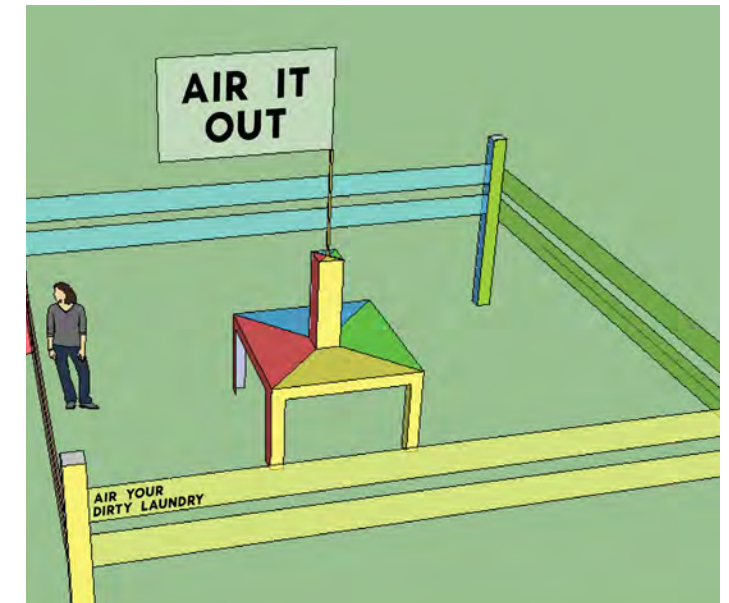
None. This piece was designed blind, meaning, we had no idea where we would be situated on the island. We knew we had to build it to be transported on a ferry and installed morning of. The design would have to be entirely self-sufficient and not rely on any existing structures, and also be sturdy enough to withstand environmental factors such as wind.

Existing Light

This project would be outdoors with no access to electricity. Daylight was our only ally.

Human Factors

Crowds can be considerable in New York City. We designed with durability and easy accessibility in mind and thought about how people would be invited to participate. With generative art, people have to know that they are the artists, the source of the art.



MATERIALS MISSION

The laundry line needed to hang from 4 poles framing the dinner table. These poles had to be lightweight and potentially disposable so we could transport them from Manhattan only once. Since this was going to be a free-standing structure, we needed a way to stand these poles upright so they could withstand wind and at least 10 pounds of tension. PVC and plastic buckets were the answer to our art-making prayers. We just had to affix them to each other. Gluing plastic is tricky business. Polystyrene, polyethylene, and polyvinyl chloride (just to name a few) and each type requires a glue compatible with the chemical structure of the plastic. Epoxy is not a panacea.



Fig 110 | previous. Initial 3D rendering of the project

Fig 111 | The dinner plates made a convenient receptacle for the clothes pins

DESIGN

We decided to base the installation on the main stage of social interaction: the dinner table. This would provide a welcoming area for people to approach and have a writing surface that made conceptual sense. Because we were transporting our materials on a dolly on a ferry and our upper body strength is maybe mediocre, we decided to not include chairs for people to sit at. This would be a walk-up experience, which worked well with the festival setting.

The idea of 'dirty laundry' lends itself well to a laundry line. To echo the square shape of the dinner table, we put a 20' square laundry line around the perimeter, a way to stake our territory. We hung the line on PVC poles secured in a bucket filled with water in each corner of the square. This square frame was the first touchpoint of the experience: people reading anonymous stories, admissions of guilt, and secrets. The laundry concept carried through to the design of the writing surface.

We wanted to use a laundry-like material that was easy to write on so we settled on cotton fabric cut into squares. Clothes pins were the obvious way for people to hang their square on the line.

Because there are so many unexpressed sentiments, we decided to organize the interaction by creating categories of dirty laundry, which were color coded to make the visual experience of the piece more eye-catching. We split the dinner table into triangular quadrants: Orange orange was for dirty laundry about yourself, yellow for friends, Green green for coworkers, and Red red for lovers. We placed simple instructions at the center of the dinner table with the supplies spread out. At an outdoor festival there are no museum labels to describe the project, so we put the title "Air It Out" on a big flag and flew it 10 feet above the central dinner table, which was an effective beacon.

“When survivors of a traumatic event finally put their feelings on the page, they experience improvements in their mental and physical well-being.”

James Pennebaker



Fig 112 | Every dinner table needs a centerpiece: a giant flag advertising the opportunity

Fig 113-115 | opposite. The color coded pieces of dirty laundry





Fig 116 | Young children responded well to the project

Fig 117 | opposite. Participants reading the instructions

Fig 118 | opposite. The instructions in the center of the table

THE INTERACTION

The interaction was two-fold: participants could read everyone else's dirty laundry, and/or write their own. At the very beginning of the festival we had to bait the lines with our own internal hush-ups, so people would make a visual connection between the stacks of fabric on the dinner table with the surrounding laundry line. As time passed, the laundry lines filled with colored fabric, a sizable assortment of quieted sentiments.

Children of all ages and adults responded well, at one point there were 3 kids on top of the color coded dinner table drawing while their parents wrote. By mid-afternoon of the first day, we had to add extra rope for the dirty laundry because there was so much of it. We also had to buy more fabric because we ran out. Some New Yorkers got mad at us at the end of the show because we had to deinstall and they hadn't hung their piece of fabric yet. The piece was so successful that the organizers of FIGMENT Boston sponsored us to bring the installation to the Rose Kennedy Greenway a few months later.

The instructional display worked well and made sense. Without these instructions arranged on all sides of the table, this project would not have worked at all. Unlike Dream State, a project that worked with and without the printed guide, the call to action was 100% necessary in this case.



TAKEAWAYS

- Generative art is a fascinating way to engage with the public and people truly appreciate the opportunity to contribute a bit of themselves.
- Source back-up materials before the day of the show. With generative art, it's hard to tell how much material will be used so have a Plan B and C.
- Wind is surprisingly strong. We had to use heavy wood lawn chairs (luckily they were bright red and worked perfectly with our palette) to keep the PVC poles from falling over.

CONCLUSION

We got a bit of press from the project, which was indicative of the impact it had on the public. The response was really powerful; people of all walks of life were moved by this experience and lauded us for our efforts. Some requested a book be written and website made to keep the experience alive after the festival commenced. I was really moved by the content of the dirty laundry. My personal experience of reading hundreds of these statements made me aware of the amount of pain and suffering we each carry around with us. It was touching to see the expressions of love and humor interspersed with the heavy-hitters. Walking around the installation I noticed an increase in compassion, an understanding that even though everyone looked really well put together, many were going through some serious difficulties. It seemed like the public came together around this installation, people took comfort in the massive amount of personal tales and they enjoyed building the art work together.

“It’s actually really calming and centering.. and much needed. I just feel better know.”

“So its a really wierd juxtaposition of confessional-type things.. about loneliness or disappointment in relationships next to these things that are completely ridiculous?”

“It’s a really great way to get something off your chest you may not be able to otherwise becuae you are afraid of what people might think.”

“I came to see it specifically and I’m surprised at how open people are and I think its something they really need. I think its beautiful. and thought provoking and sad. All of those things wrapped into one.”

“Everyone is putting all their dirty laundry up there and no one knows who put it up there. Its absurdly ironic to me that this is actually deeply private. Which is awesome.”

“There’s some people that obviously have some anger to express and some people that have a lot of love to express so its a really beautiful thing they’re doing.”



Fig 118 | opposite. Samples of participants' contributions

Fig 119 | Stills from the documentary video of the project



CS08

CASE STUDY 08
The Big Blur

The Big Blur

College of William & Mary, Virginia.

MAR 2015.

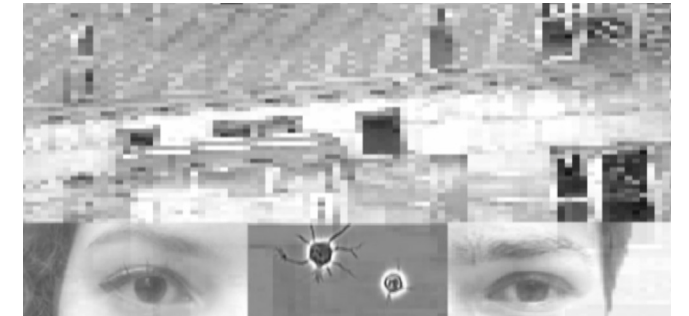
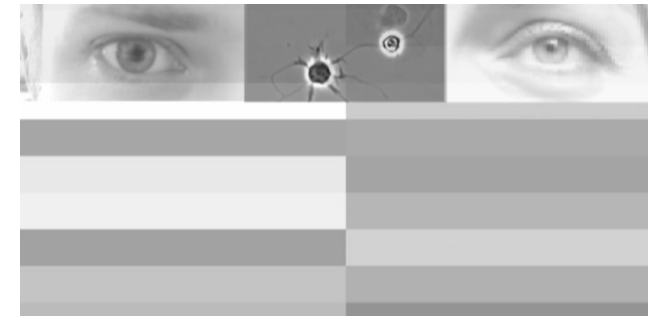
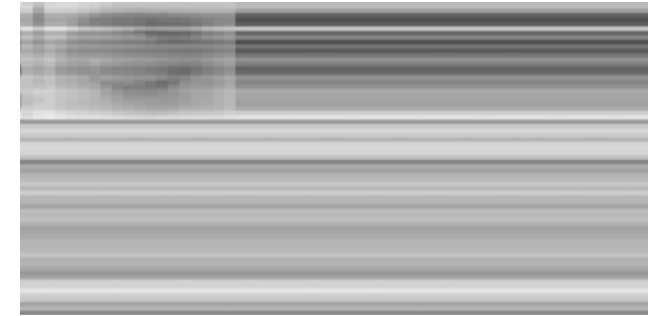
In the future, we humans may undergo marginalization in a ubiquitous digitized civilization. As we 'progress', physical reality is being usurped by the non-physical reality that new technology affords. Are we Americans spending more time looking at digital pixels of ourselves than our actual physical selves? How is this onslaught of screen-based interaction affecting our brain cells and our ability to have quality connections with others?

Quality eye contact between two people is an indicator of connection and trust. It cannot exist in a screen-based reality, even if you are excellent at Skype. Subtle shifts in gaze, facial expression, and body language require a high level of perception and attention, activating a wide swath of our cerebral circuitry. Neural connections slowly disintegrate as a result of over-reliance on social screen time because less neural processing is required in a 2D space: “..3D environment requires allocation of more brain and sensory resources for cognitive/motor control than 2D” [Sloubovov]. This fact compounded by our steadily increasing appetite for screen-based interactions is not neurologically promising.

Under the guise of convenience, a wide variety of institutions including schools, shopping malls, and banks, are becoming mechanized, pixilated, and put online, giving us more opportunity to avoid human-to-human interaction and downsize our brains. This video explores the pixelization of our future, the response of our neurons, and the decay of the physicality of our social architecture as it becomes subsumed by the larger reality of the Internet.

“One of the consequences of living in a sedentary Facebook society is that we don't flex the cerebellum enough and often miss out on eye-to-eye connections. The lack or movement in a three dimensional space and human interactions causes the cerebellum to atrophy and impairs its function.”

Bergland, Christopher.



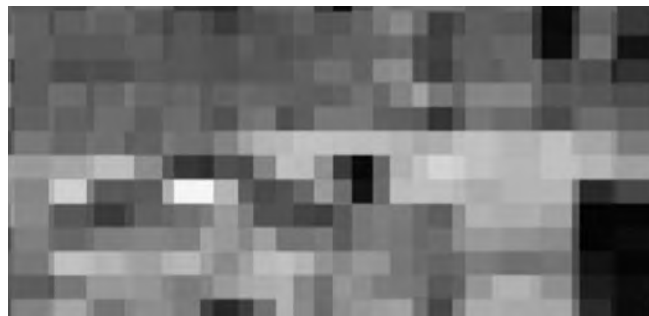
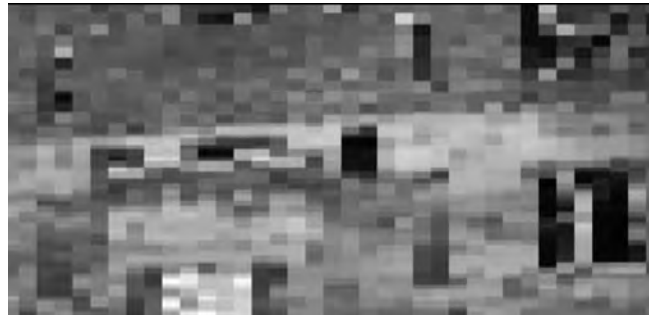


Fig 120 | Stills from the video



PROJECT GOALS

The desired behavior change inspired by viewing this 3:45 minute looping video is simple: make quality eye contact. That's it. The power of this gesture can be felt when you compare the experience of video-chatting with in-person chatting. There is still a connection made but there is something missing in the satellite-based interaction. The reason for this deteriorated interaction may be the distance a signal has to travel during transmission, but more likely, it is a lack of pupil-to-pupil connection. The subtlety of a loved ones pupil dilating ever so slightly during that first millisecond of connection is absent.

It is these subtleties and nuances that the limbic system picks up and translates into valuable information we need to develop trusting interpersonal connections.

DESIGN CONSIDERATIONS

Existing Architecture

The video was to be projected on a wall at the College of William and Mary. I had to relinquish control over all environmental factors since I could not go to Virginia to oversee the installation.

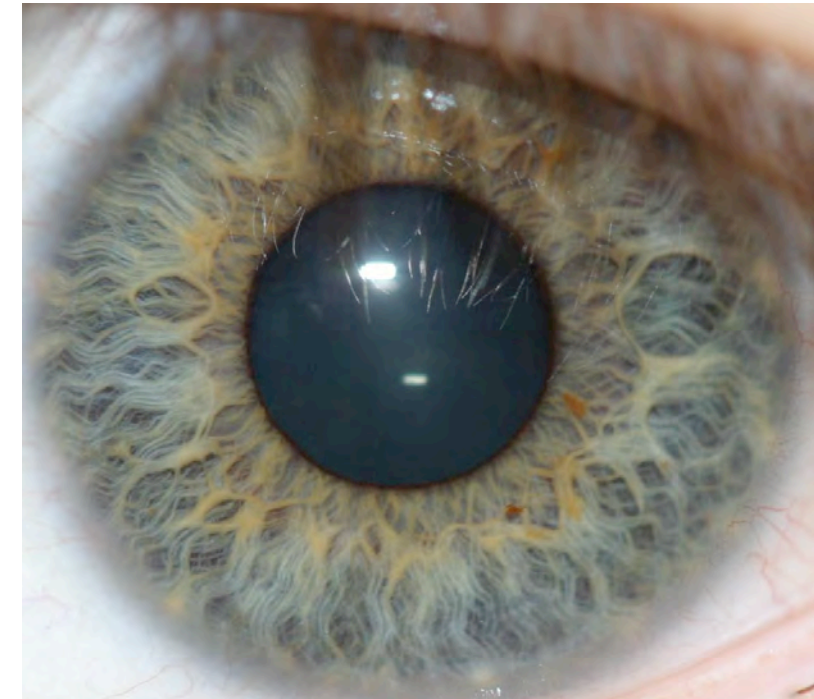
Existing Light

With projected video, hopefully very little light exists in the installation site. The design of the video was not influenced by environment whatsoever.

Human Factors

People walking through the gallery space will be initially drawn in by the video itself, and as is the case with most art video installations, will watch for a little bit and then walk off. This is the reason for the interactive component.

Figs 00-00 | previous and left. Stills from the 3:45 second video



Figs 121 | Eye contact promotes neurogenesis

DESIGN

The video includes 6 eyes opening and closing. As the eyes open and conceptually 'see' each other, a video captured by a scanning electron-microscope of 2 neurons growing a neural pathway towards each other (courtesy MIT) appears on screen. A loud crackling noise begins and ends with the simultaneous opening and closing of eyes. The crackling is the actual recording of neurons firing and was downloaded from a neuroscientist's (Matt Ephys) soundcloud channel. The eyes appear and disappear into a hazy blend of pixels and eventually a dilapidated building appears. This pixelized image of deterioration is a reflection of the decaying quality of the architecture of our social culture. There will be a web cam mounted outside of the gallery with instructions.

THE INTERACTION PROTOTYPE ONLY

Participants can stand directly in front of a web cam before they enter the gallery. A four second video clip of their eye is patched into pre-determined area in the existing video inside the gallery space. A filter is put on each video before it is patched in and coordinates with the ebb and flow of pixels on screen. Getting people to have their picture taken for a mysterious reason might be a difficult task, never mind getting a live video of their eyeball. I don't want to trick people but I also want to ensure participation. Putting a sign above the webcam that explains exactly what to do and what this recording will be used for is imperative. Clear and simple instructions are displayed to limit confusion and poor integration with the original video.

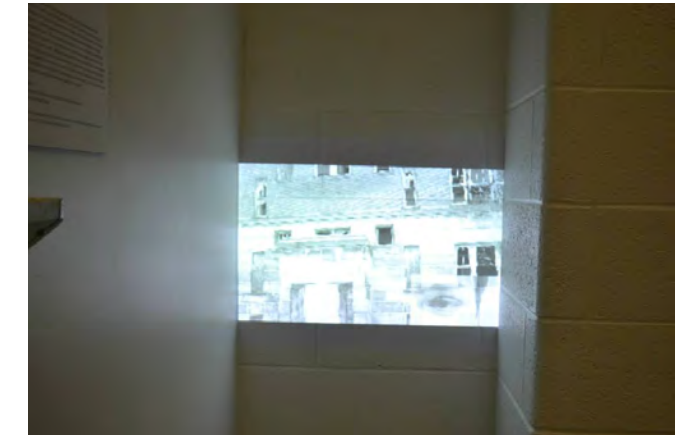


TAKEAWAYS

- Working in video is much more forgiving than working in physical space, much like the web project. The timing of when visual components appear, sound fading in and out, and integration of all the elements can be endlessly edited, which is drawback and a benefit.
- Take breaks from screen-based projects. Staring at the same thing day in and day out causes a loss of perspective on the project. This applies to non-screen based projects as well, but the screen takes more of a toll on perception.

Fig 122 | above. Kawandeeep Virdee at the opening at Cyber Arts

Fig 123 | above right. Projection at the opening of "Posthumanism Capitalist Architecture" curated by Lindsay Garcia. College of William and Mary.



CONCLUSION

Making a video is not nearly as exciting as making a physical piece of art. When I observed people watching it, there was nothing to see, just a person wearing headphones staring at a screen. It was a fun foray into the flatscreen's capabilities and I still want to actualize the interactive component, which might make this project more interesting to me. As a piece of commentary on our cultural behavior, the project was effective in communicating the desired message. The video inspired a few chats about eye contact and the value of face-to-face communication, so there was evidence of a positive impact. If this video caused any behavior change is hard to determine, but hopefully people who saw it and read the description in the gallery have a new understanding of what happens when they are looking another person in the eye.

CHAPTER

SEVEN



CONCLUSION & THE FUTURE

CONCLUSION

Providing the public with an opportunity to be a co-conspirator in their experience of art has been an ultimately fulfilling experience. Observing the public's reaction to all of the aforementioned projects has demonstrated that intentionally designed visual communication systems can have a noticeable impact on behavior. Giving people an opportunity to get a foothold in a work of art, to insert themselves into it, and to potentially cultivate more awareness, takes a well-thought out combination of research, design, and production.

The intention for each of these projects was grounded in scientific research and I hope that these pages have provided solid proof that employing the platform of interactive installation art is not only an effect technique to promote behaviour change, but also a way to communicate the results of scientific research. The challenge for the next generation of artist-designers is to find the information, the data, the research, that is most compelling, and figure out a way to translate that into an accessible and meaningful experience for the public.

A lot of useful research lies in a fallow field, available to professionals who read their monthly journal subscriptions, the Huffington Post, or the I Fucking Love Science blog. These sources must be sought out but if the information relayed in these various missives is translated into a physical interactive experience, the impact of the research can be more widespread.



Fig 124 | *Fresh Media 2015 opening at Cyber Arts Gallery*

THE FUTURE

The future of my artistic process will continue to rely on research and delivering meaningful experiences. I plan to focus on projects that activate public space and also inspire dialogues about social habits and/or public policy. I hope to enter the field of public art with projects motivated by both communal space generation and the communal evolution towards a more conscious and just way of living. Two key components will play an important role in the next chapter of art practice:

1. Creative Placemaking
2. Artist as Interlocutor of Social Change

I've already begun to embrace these two concepts, as evidenced by an art installation I made with a few classmates in an MIT class I took this spring, "Public Art Seminar". Every spring semester, MIT takes a group of students to a foreign country. Usually the country is experiencing some kind of transition and attempts to create a public art project. This year the destination was a decommissioned NATO base in Iceland.



Fig 124 | Using a flag to draw attention to obsolete infrastructure, these concrete blocks, used to transport electricity in Iceland

Fig 125 | right. There were 19 separate concrete blocks on the public site in Keflavik

Experiment in Public Art

Àsbrù NATO Base, Keflavik, Iceland [2015]

We arrived in Keflavik with a decent amount of site research under our belt. Video chats with locals, professors from the University of Iceland, Tinna Gretarsdottir and Sigurjón Baldur Hafsteinnssonand (aka 'Siggy'), informed our perception of existing human factors on the base and a gave us a good idea about what to expect. No academic 'vacation' is complete without at least one PowerPoint presentation, and we got one on the very first day. Sigurgestur, an employee of KADECO, the corporation hired by the Icelandic government to manage the entire Asbru site, gave us espresso, homemade fish soup, and a very comprehensive presentation. We learned that Iceland has enjoyed a steadily decreasing dependency on non-renewable energy sources, especially oil, since the 1950's. Instead of this finite and dirty source, the small country of 300,000 runs mostly on their ample hydro-electric and geo-thermal natural resources. Energy might be the cheapest thing to buy in Iceland.

During our extensive tour of the site, including bomb shelters, a high security communication bunker, an indoor shooting range, and an empty pool, I was inspired by a compelling site on the ridge above the security checkpoint building. It appeared to be a line of giant hollow blocks arranged on a ridge on what I discovered was land owned by the contracting company that built Asbru. Our hosts willingly arranged a meeting with one of the executives.

Enter Gudmundur, an amiable contractor for IAV, the 60 year old company responsible for a majority of construction in Iceland, including the construction of the buildings on Asbru and Harpa in Reykjavik. He drove us up to the potential installation site. According to his memory, the giant blocks of cement were part of a long piping system for water, oil, and



other resources. Some were below ground and some were above but more importantly, the company no longer uses this infrastructure because it is outdated. Since the holes in the cement were used to transport oil, I thought this would be a useful location to draw attention to. Was there a way to reactivate this site while commenting on Iceland's unique ability to get off oil?

We drove our van to the workshop on the base in hopes to finding some supplies. The men working there were overjoyed to have visitors and after a tour of their shop, we found a large sheet of white plastic and a white plastic drop cloth. I made some sketches of different ways to draw attention to the obsolete oil transportation system. Due to time and resource restrictions (we essentially had one day to create a work), we went to the workshop on base to explore materials. I found a white plastic tarp on the floor. The wind on the ridge was noticeable so I decided to design a flag system that could be easily implemented with the found materials. Not exactly a Christo and Jean Claude level project, the flags worked well with the existing environmental factors. The constant wind-blown movement of the colored flags created a visual counterpoint to the stagnant concrete monoliths.

It is highly doubtful that this art installation had any impact on behavior or promoted any social change. If this had been a more full-fledged project and we actually succeeded in activating the site with not only art, but also people, perhaps dialogues would inspire awareness of Iceland's clean energy practice. This type of conversation is the basis for a social change, one that educates the public about the current status of a behavior that everyone engages in, in this case, natural resource consumption.

CREATIVE PLACEMAKING

Public art design and production fits neatly under the umbrella of "Creative Placemaking", which includes not only physical art objects, but also experiences (i.e. festivals) and redevelopment of the built environment (i.e. remodeling a dilapidated mill into art studios).

"Creative Placemaking", a paper recently published by The National Endowment for the Arts describes the benefit of this practice:

"Creative placemaking animates public and private spaces, rejuvenates structures and streetscapes, improves local business viability and public safety, and brings diverse people together to celebrate, inspire, and be inspired."

A brick wall in a neighborhood is not a creative place, but if each brick in the wall is painted by members in a community, it instantly becomes a work of public art and a creative place. A work of public art fosters relationships between people and place and strengthens our appreciation of our location. Public art can also create a destination, which is what we tried to do in Iceland, by creating an experience and adding value to an undervalued location.

ARTIST AS INTERLOCUTOR FOR SOCIAL CHANGE

A few years ago I attended a conference at Harvard Design School about public art, hosted by the Cambridge Arts Council, one of the most reputable and well-funded public art councils in the country. The mayor at the time told a promising tale about a building that people peed on regularly. This popular display of public urination came to a screeching halt when an

**“There must be
an art of action,
interfacing with
reality, taking
steps – however
small – to repair
the social bond.”**

Claire Bishop

artist was hired to paint urinals on the wall. Granted, changing the habit of where people relieve themselves is not the most noble achievement, but this example demonstrates how the presence of art can change relationship to and appreciation of space.

The projects I've discussed in the last chapter on cultural habit change are the faint beginnings of my future pursuits in social change. The mediums and messages I've chosen thus far in my career have been microcosmically focused on the individual. The scope of my art projects has always had a directly personal or interpersonal quality. Dream State aimed to improve relationship with self, Air it Out aimed to improve both relationship with self and other. The topics I hope to address in the future embrace the community as a whole, similar to Mockus' art interventions in Bogota. I intend to continue addressing the relationship with self and other, but focus on behaviors that have a broader social impact, as the Keflavik intervention attempted to achieve with its commentary on natural resource consumption.

UNSOLVED MYSTERIES

I don't know what kind of social change I will attempt to create with my future projects, or what kind of space I will attempt to reactivate, but I will continue my process of working through my design considerations, connecting with a purpose, and asking myself the questions. The answers will come when I connect with and research a community and a site to learn about what I can contribute to the positive development specific to its members, specific to place. Only then can I make a public art installation that is relevant to both the place and the people, art that is designed to propagate waves of positive social change.

“Places with strong public art expressions break the trend of blandness and sameness, and give communities a stronger sense of place and identity.”

“Why Public Art Matters” Americans for the Arts Public Art Network

FINAL TAKEAWAYS

The final takeaways are mostly questions. They are questions to dig the spurs into the design process involved in art making. In addition to the ‘why’ and ‘how’, I also have added the ‘what’.

Ask why.

When it comes to designing interactive experiences, this is the most valuable question.

Why are you designing this interaction in this exact way?

Why did you choose these specific materials to work with? Why this color or structure?

Why should anyone care about this project and invest their time and energy into participating?

Why will they come back?

Ask how.

This is the most fun question because it involves experimenting and a lot of trial and error.

How are you going to make this creative idea into a tangible, real experience?

How are you going to install this project?

How are you going to fix it if it breaks?

How will the public approach the project and be enticed to participate?

Ask what.

Another important question especially as it relates to your message.

What message are you communicating?

What design {physical space, light, sound, video and/or online experience) will be the most effective to deliver your message?

What effect does your work have on the public?

What is the experience you are hoping to create and for who?

DESIGN INSIGHT

All of these questions can supercharge analytic thought, which can hinder the free-form associative thought mode necessary for innovation. Design thinking is valuable skill but, as I mentioned in the chapter on creativity, linear thought can sometimes lead to a dead end and frustrate the process. Exercising contextual focus and maintaining a productive flexibility allows for solutions and new ideas to occur. Letting your state of consciousness expand gives you more mental territory to work with within the framework of the aforementioned design questions. Design insight is that “A-ha” moment during the design process that bears valuable fruit. Learning how to think and stretch out the thought process to a mental space, the head space where there isn’t a lot of thought, is the Golden Zone of design.

I hope the future generation of artists will expand their design thinking process, suss out their goals and concepts, while simultaneously enjoying the intrigue of the process.

Afterall, it’s only art.



THE
END





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