Blowing Blues: Coping with Negative Emotions through Breath Control

by

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A Thesis Paper Presented to the

FACULTY OF THE USC SCHOOL OF CINEMATIC ARTS

UNIVERSITY OF SOUTHERN CALIFORNIA

In Partial Fulfillment of the

Requirements for the Degree

MASTER OF FINE ARTS

(INTERACTIVE MEDIA)

May, 2013

Acknowledgments

Special thanks to Marientina Gotsis, my committee chair. Her expertise, dedication and patience deeply influenced this project. My committee members: Mark Bolas, who lent invaluable perspective and advice; and Thai Phan, who helped me with technical and design challenges.

I would also like to thank Peter Brinson, who supported me in pursuing an unorthodox interaction mechanic; Jeremy Gibson, who helped me with a difficult design problem; and Steve Anderson, for his inspiring feedback. Thanks to Tracy Fullerton whose feedback sparks confidence and new paths of thinking.

Lastly, I thank my parents for their unshakable support.

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Abstract

This paper introduces *Blowing Blues,* an interactive application for building player's "immunity" against anxiety and negative emotions. The application uses breath-based interaction inspired by neuroscience, psychology and games to help players cope with their inner "enemies".

Introduction

Stimuli, Mind, and Emotions

The pressures of daily life and external stimuli can act like invisible messages "attacking" the mind, and leaving a "sickness" within. This perspective comes from *Brain Mind Healing,* a popular book written by Japanese physiologist Akikazu Takada. In his book, Takada used psychology theories and his physiology training to self-treat his own depression with reported success. *Blowing Blues*, an interactive health application, borrows from his insights and strategies to allow users to practice Takada's methods to improve one's emotional self-control.

Relationship between breathing and emotions

When we feel "stressed" we find it hard not to sigh. When we finally finish a challenging task, we also exhale and feel a sense of relief. Doctors often advise a nervous patient to "take a deep breath". Our breathing is deeply connected to our emotions and regulating our breath can be an important skill for managing our emotions. *Brain Mind Healing* also prescribes breathing as a key way to improve emotions. In a separate article, Takada discusses the benefits of Buddhist breathing practice discussing how these ancient techniques can trigger the release of serotonin, a hormone that can help "settle" the mind.[1]

Breathing and the Power of Suggestion

Awareness and regulation of breathing, commonly performed in meditation,

[1] Takada, "The Benefits of Buddhist Breathing Techniques." 2009.

can have a positive effect on mind and body. Unfortunately, many people, immersed in the frenetic pace of activity of daily life, fail to recognize that something as fundamental as breathing can improve their health. *Blowing Blues* aims to help a wider audience use breathing to better understand and manage their emotions, which can help them develop greater resilience against life's “stresses” and worries.

In mindfulness meditation, one aims to focus the mind solely on internal sensations, including breathing and to ignore distracting thoughts. This is difficult for many beginners because one's mind can easily wander, leading to a sense of failure that discourages one from pursuing meditation further. *Blowing Blues* is inspired from this traditional method with some differences. The focus here is in on confronting negative emotions as “in-game” enemies to literally and figuratively “blow” away using the player's physical breath. Because exhalations naturally go with inhalations, the full process of breathing organically arises from this method, achieving similar goals as with meditation. Another difference from traditional meditation is the association between the player's real negative feelings and the in-game representation. The removal of in-game versions of the “bad” emotions suggests the capacity for being able to eliminate the player's actual negative emotions.

Feasibility of breath control within an interactive medium

Microphones are now ubiquitous in computers and mobile devices, allowing new forms of human-computer interaction. Microphones can sense the user's breathing rate and intensity through sound volume. Through this mechanism, it becomes possible for players to see in-app representations of their breathing in an interactive environment. This can help them get into the habit of using breathing for emotion regulation.

Breath control is an interesting and relatively unexplored area for interaction by game designers. While on the surface it may seem limited to be used for interaction, it is surprisingly rich and multidimensional. Prior research has shown that breathing can act as a “button” with an on/off state; a three way switch through inhale, exhale, and holding breath; an analogue slider based on breath intensity; or a measure of frequency through breathing rate.[2] Also, there are various physiological limits to breath intensity, duration, and frequency makes this mode of interaction surprisingly faceted and open to further exploration.

Unlike projects which use modified industrial gas masks, flow sensors, chest expansion sensors and other dedicated peripherals, in this system, both the player's inhales and exhales are detected in a non-invasive or cumbersome manner using standard microphone hardware widely embedded in most computing platforms. Minimizing the cumbersome aspects of breath sensing can reduce the inconvenience and aggravation caused by equipment, shifting the focus on the aesthetic experience.

Additional Features using the Microphone

A Fast Fourier transformation algorithm is used to process the signal from the computer microphone to help distinguish between inhalation and exhalation. The software keeps track of breathing frequency, duration, and intensity of the breath using the measured volume level.

Integrating Stereoscopic Head-mounted Displays

New head-mounted displays (HMDs) are being pioneered at the Mixed

[2] Tennent, “Breathalising Games: Understanding the Potential of Breath Control in Game Interfaces.” 2011.

Reality Lab at the USC Institute for Creative Technologies. Patients with serious mental health problems often require a stand-alone environment separate from physical reality in which they can be immersed for healing. This virtual reality technology can block out physical reality and immerse the user in a stereoscopic, computer-generated environment in which they can practice fighting against their inner “enemies”. HMDs support the goal of *Blowing Blues* by increasing immersion. The application includes an artistic simplified rendering of a three-dimensional model of the human brain to allude to how negative messages affect the mind. This can encourages the patient to fight negative signals as part of self-treatment.

Background

The effects of persistent negative emotions are widespread. Depression affects more 350 million people worldwide. It has been estimated that by the year 2020, depression will be the second leading cause of disability throughout the world. Emotion regulation problems can affect other areas of health. Risk for Alzheimer's disease has been shown to increase with depression[3]. At its worst, mental health suffering can lead to death. In 2010, there were 38,364 fatalities by suicide in the United States[4]. One million people die from suicide globally every year[5]. It is the 10th leading cause of death both in the United States and worldwide[6].

Despite these alarming statistics, not enough effort is directed towards prevention of mental illness and maintenance or improvement of mental health.

Being mentally healthy implies the ability of a resilient emotion regulation system and self-reported psychological well-being. While external social and environment conditions influence our states of mind, improving one's internal sources of influence is critical for mental health. Change begins on the inside.

This project is an attempt to create an interactive system to make it easier to practice techniques for treating emotional obstacles and to help cultivate a positive mindset and prevent falling into the abyss of mental illness.

Building a better bridge between the domain of psychological research and the mainstream of practical techniques is one aspect of realizing this goal.

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[3] "Depression Linked to Alzheimer's Disease"

[4] "FASTSTATS - Suicide and Self-Inflicted Injury."

[5] "WHO | Suicide Prevention (SUPRE)."

[6] "CDC Features - Preventing Suicide."

Interactivity and game design offers unique abilities to put this knowledge into action while making it accessible and engaging to a wider audience. Unlike reading, watching, or listening, interactive applications and games allow us to experience guided empowerment, and to directly practice the therapeutic techniques in an environment that responds to one's actions through immediate feedback. This project leverages the affordances of interactivity to help users realize their potential in mastering their own psychological landscape. In the next section, I will present an overview of some existing interactive works that engage with physical or emotional health.

Prior Art Review

The discussion of three projects below summarize novel attempts at improving health and wellness through work at the intersections of gaming and interactivity, health, and data visualization.

Jane McGonigal's *SuperBetter* is an online-based tool for improving personal resilience. It features an interface to record and keep track of your self-improvement activities. It is a place to learn about the scientific basis behind various wellness-enhancing activities and to connect via social media with other actual players who share similar health goals. The player starts by setting an overall goal,which in *SuperBetter* parlance is called an “epic win.” The flow of playing consists of doing daily real-life activities recommended by the website and logging in to record what you have accomplished. The intention is to have real life progress correspond to “game” system progress. The interface uses elements borrowed from the language of game design like a point system, power-ups, quests, bad guys, and others to provide motivation and frame the self-improvement process. When the player completes an “epic win”, she is rewarded with motivational messages and can subsequently set a new goal to begin a new game. As in *SuperBetter*, this thesis project aims at improving resiliency. However, this project is not a website with limited interactivity, where the “game” is played in real-life, but an application that emphasizes breathing as an interaction mechanic to help the player get better and explore a three-dimensional virtual world.

Created by Nathan Yau, y*our.flowingdata.com (YFD)* is an online data visualization service for personal data collection, as well as a decision tracking service aimed at the general public and non-professional audience. Its premise is that by keeping track of and better understanding one's habits improves the

potential for personal behavior change. Users use the popular micro-blogging service Twitter to input data and messages about themselves. The content of the data is completely determined by the user. The user can enter data about body-weight, eating and sleeping habits and so forth. After collecting the data, users can log-on to to their personal account interface to see the data visualized and interact with it. Users can explore the data by customizing views and adjusting parameters. In a real-world scenario, users can for example, keep track of their personal weight loss goals by seeing their progress over time visualized as dynamic, interactive charts aimed to be understandable by non-statisticians and lay audiences.

There are several noteworthy design aspects to YFD. One is the decision to leverage Twitter for data input and collection. This is advantageous because it allows YFD to fit more easily into the user's already existing data entry habits. To log data about what one ate, one simply sends a message in the form of a keyword and a value. For instance: “ate roast turkey.” Users do not have to learn a specialized language like SQL. Because of this simple syntax, data entry becomes more conversational. Furthermore, users can enter data using their mobile devices anywhere or at anytime without waiting for access to a computer. Data could be logged as an event or thought occurs. Using Twitter as a data proxy allows YFD use to feel closer to normal Twitter use and benefit from regular usage patterns, making data collection more frequent. Users are more likely to use YFD if the learning curve is minimized and data logging becomes a seamless part of an existing social media routine.

YFD's online interface is another notable design aspect. The interface design takes into account users’ motivation for data collection and visualization. For instance, a large motivational headline is prominently displayed on the page. In this case, the message outlines a weight loss goal. This interface element acts

as a constant reminder for the user of his or her long-term vision and goal by doing data logging and visualization. There is also a bar chart showing a time-line of progress. This visualization complements the motivational message by giving context to one's actions and showing how far the user has progressed and how far he or she needs to go to reach the goal stated in the motivational message. The sorted tag cloud is used to visualize emotion-related data in a way that captures the organic nature of feelings. Word size corresponds to frequency of occurrence in the database. This creates a more natural representation than traditional numerical and abstract chart or graph.

Sonic Cradle is an interactive system developed by a team at the Interactive Arts + Technology program at Simon Fraser University for fostering meditative experiences to manage stress and to help teach and demystify meditation for general audiences. In this system, a user lies down on a hammock in a dark chamber absent of visual stimuli of the physical world. The user's respiration is measured by chest expansion-based biofeedback sensors. This data then drives a surround sound speaker system in which patterns of breathing interactively creates and modulates new sounds. Holding a breath creates a new sound, which can then be modified base on respiration parameters such as rate, depth, and thoracic to abdominal ratio. Repeating this process locks the attributes of the previously created sound and adds a new sound that can be modified in the same way. In the overall experience, the user’s breathing action shapes and mixes various pre-recorded sounds, creating an ambient soundscape.

This project has several key design aspects that work holistically to affect the experience. Situating users in a dark room prevents external distraction while lying in a hammock prevents internal distractions like discomfort or pain. This sensory deprivation also enhances immersion by focusing the mind away from physical stimuli and towards the subtle sensations of the media to create a holistic

experience of another world. Sonic Cradle's breath-based interaction emphasizes user creative control through biofeedback, placing users in a position where they can choose to actively shape their mediated world. As in mediation, the user's attention becomes a key element of control. The participant can focus inward on his or her breathing while listening to the sonic feedback. Unlike traditional meditation and mindfulness practices where difficulty maintaining attention can lead to a feeling of failure, in Sonic Cradle, environmental sounds are always coupled with breathing whether the user intends it or not. Thus, the distracted user will notice the changing sounds and re-orient their attention back towards respiration. Without initial instruction or pressure put on the user to maintain focus, participants may loop through periods of attentiveness and distraction without perceiving it as outright failure. The feedback feature helps make *Sonic Cradle* easier to use for non-mediators.

Through informal testing from co-design sessions, optimizing the user's sense of control was discovered to be a critical dimension of the design. User engagement depended on having enough control to prevent provoking a stress response while maintaining long-term interest through subtle interaction mechanics. As will be discussed later, the process of developing this application led to similar conclusions.

The authors of *Sonic Cradle* explicitly acknowledged that technological solutions can contribute additional anxiety. They intended their system to be used as a way for people to learn specifically “non-technological practices” to manage stress. This is an important note for the design of my thesis project. While technology is often a cause of unnecessary stress, it can also be designed specifically to work for psychological wellness. *Blowing Blues* is inspired by the notion that tools can promote health. As will be discussed later, another avenue of research relates to how players can translate what they learned through using the tool in their non-technological health-related practices.

Lastly, it is interesting to note that *Sonic Cradle's* development approach constitutes the practice of "*Research through Design",* meaning the creation of a design artifact and also a theoretical framework with implications beyond the scope of the original artifact.[7] For example, formal research into the psychology of immersion which demonstrated the mind's tendency to constantly generate cohesive subjective realities from senses, become part of a theoretical framework that informed the aesthetic and interaction design of the artifact itself. The "Discussion" section of this paper will explain how *Blowing Blues* hopes to contribute to new theoretical frameworks useful for future research and artifact creation.

[7] Zimmerman, "Research Through Design as a Method for Interaction Design Research in HCI." 2007.

Blowing Blues Structural Design

The application consists of two primary parts: an introductory interactive diary-like section called the “Diary Box”, and the main section called “Blowing Blues.” Named after the overall project name, “Blowing Blues” is a three-dimensional and if using a HMD, stereoscopic world where players uses their breath to interact with virtual objects, which act as metaphors for their own negative emotions.

Diary Box

The “Diary Box” section starts with a virtual feather that drifts in an organic way in response to the player's breath through the microphone. Occasionally, the feather may touch a watery surface below, creating a gentle ripple. After a few breaths, the feather will explode into particles that transform into a motivational or insightful message or quote.

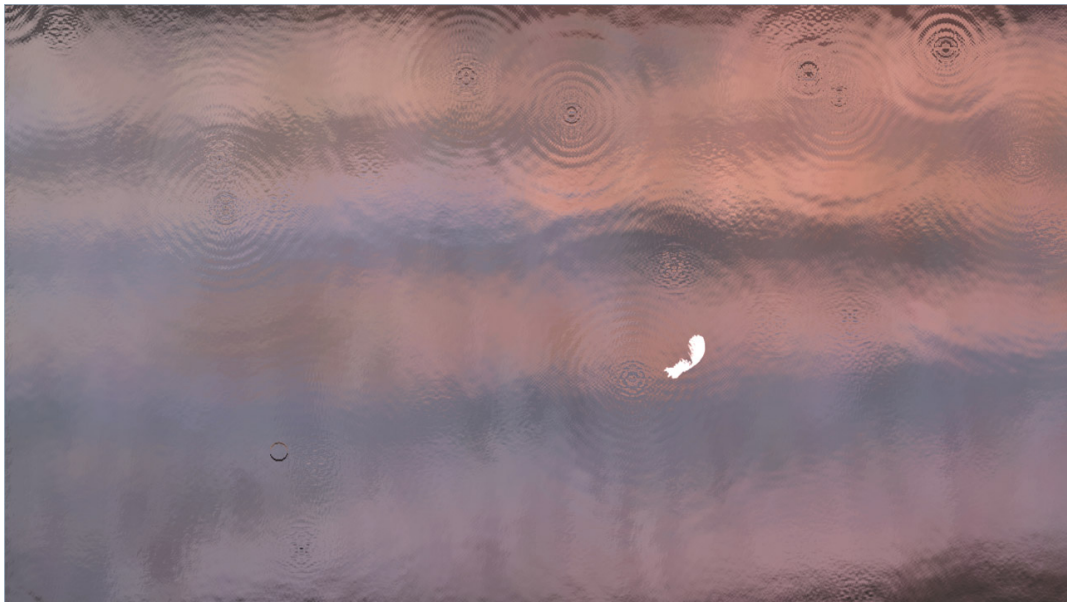

Figure 1: “Diary Box” section showing drifting feather.

Figure 2: Feather exploding-out as letter particles.

Figure 3: Particles fading into letters and coalescing into a motivational message.

Figure 4: The fully formed motivational message

For example, these messages include, “sometimes your joy is the source of your smile, but sometimes your smile can be the source of your joy”[8] or “when one door closes, another opens.” Integrating breath control while playfully interacting with the feather entices players who may feel a sense of ennui and stodginess a brief opportunity to breathe and gain relief. The player can blow quick breaths at the feather daily to see a new phrase or quote. The design goal of these small acts rewarded with positive messages is to spark in players a sense of hope or having support for the soul. When the individual letters of the saying fuse into a single point and fall into the water, a large ripple spreads out, signaling the entry into the journaling section of the *Diary Box*.

Diary Box Data Visualization

The journaling section offers four arbitrary colors as represention of four basic

[8] A quote from the Buddhist Monk, Thich Nhat Hanh.

emotions. Red represents happiness or excitement, yellow represents anger, green represents feeling ”balanced” or normal, and blue represents feeling pressure or anxiety. The user can further adjust the saturation of each color to reflect the felt intensity of one's emotion. Users are asked to choose a color before starting. This creates an entry with each time they play and they can tag the emotional variance and intensity of their current writing session.

Users journal though selecting letters with the mouse. Letters fall like snowflakes down the screen, This is called “snow writing”. The user can also type on the keyboard to create daily journal entries. As the user selects letters or words, they fall into a watery surface, creating a ripple. While the user can see the selected individual letters, she cannot see the whole word appear normally on the screen as you would if using a word processor. When done writing, the entries are visualized as an infographic with the color that was chosen previously. Journaling and diary writing are practices integrated within the game's overall health goals. Diary writing, unlike other forms of personal writing like blogs or other social media practices, is a private activity. The relaxed pace of “snow writing” is designed so that one can slow down to process and express their feelings more truthfully.

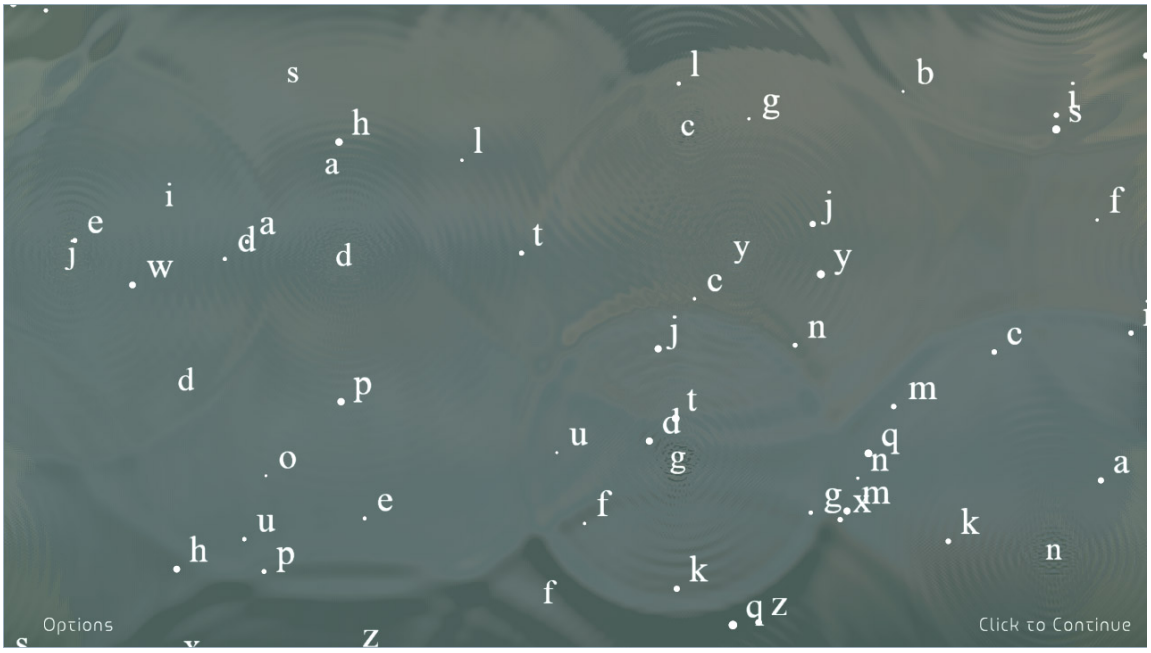

Figure 5: "Snow Writing" in the Diary Box.

Research has shown that the process of writing down negative feelings can help us feel better. In a study done by psychologist, Sonja Lyubomirsky, a group of participants with negative experiences where asked to write about that experience three times on three consecutive days for fifteen minutes each. Another group was asked to just ruminate about their negative experiences. After the period of about a month, compared to the control group, those who wrote felt better while those that only thought about it did not[9]. The process of writing helped one analyze and make sense of a situation. Simply thinking about the painful event was not beneficial because it only replayed the emotions in the mind. On the other hand, people may naturally want to express themselves to others when in a bad mood. This, unfortunately, may lead to even more difficulty because of misunderstanding and social acceptance issues. The goal of the diary box is to give the player a safe space for emotional processing. In the *Diary Box*, the player is given a safe, private environment in which they can reflect and process those thoughts without worry of

[9] Lyubomirsky, The Costs and Benefits of Writing, Talking, and Thinking About Life's Triumphs and Defeats. 2006.

social embarrassment or negative consequences. This software based journal writing acts as an open, empathic listener, letting the user remove the mask of social acceptance to gradually and sincerely work towards making sense of their negative emotions. This cannot replace the value of empathic social responses or professional therapy, but for individuals whose tolerance for social interaction is very low or for those who cannot afford therapy, Blowing Blues can be a first step for confronting or coping with their emotions.

About Blowing Blues

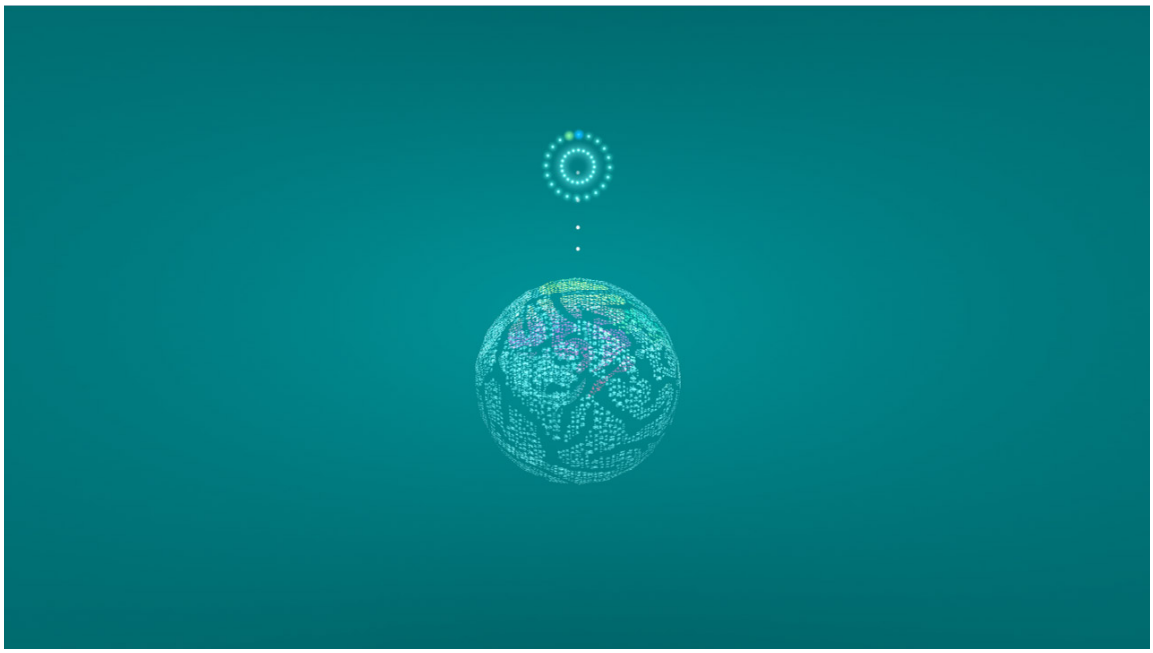

Figure 6: "Message ring" object coloring the "brain world" with emotions.

The Blowing Blues part of the application aims to educate players that chronic lingering negative thoughts from the mind can eventually damage their "brains" and cause physically-manifested illness. The setting of "Blowing Blues" is a three-dimensional artistic, abstracted "mind world" (see Figure 6). A message ring object carrying colors representing various emotions encounters the "brain world". The message ring object transfers its colors onto the brain world, metaphorically coloring

the mind with emotions.

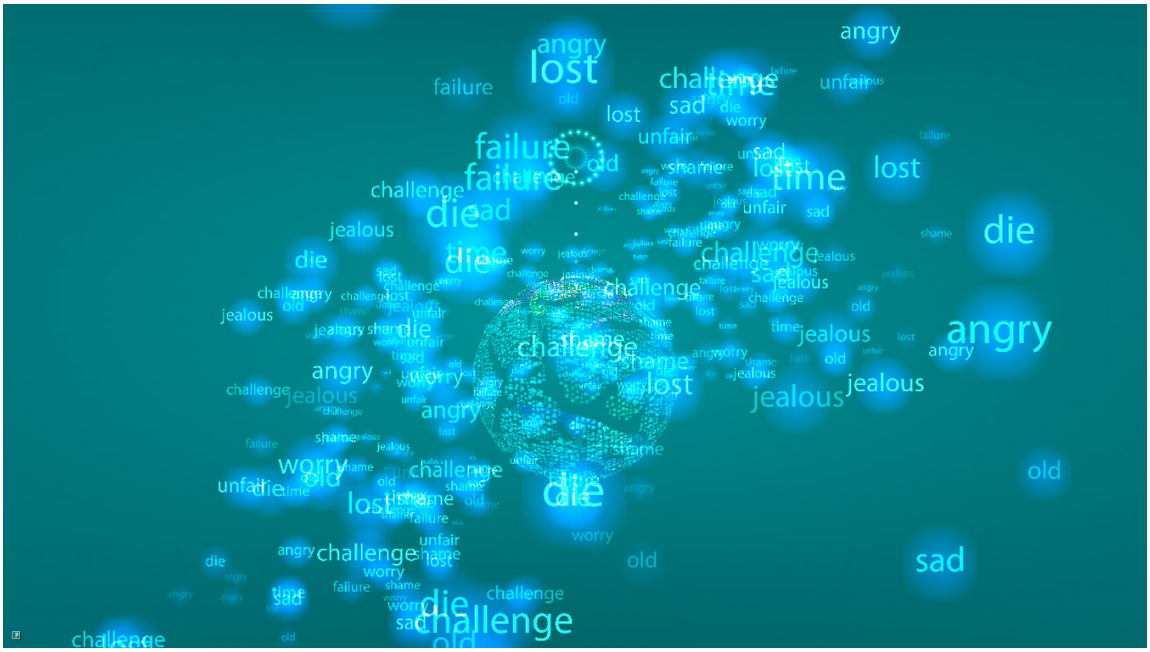

Figure 7: Cloud of negative emotion words.

A cloud of negative emotion words surrounds and enters the brain object. The ring and brain world objects merge, becoming an “emotion virus”, the game mind world's enemies”. This virus permeates into the mind world and suddenly more emotion viruses fade into view, each one producing colored “vapor” objects. The vapor objects gradually permeate the brain space and attack green/healthy brain cells. This causes the cells to first turn blue, the color of sadness, then purple, the color of sickness, and finally, brown, the color of “withering away”. These emotion viruses also display words expressing different emotions such as anger, challenge, and so forth. The player's goal is to save the mind world by breathing and blowing away the emotions viruses and by association the hurtful vapor and negative emotions words.

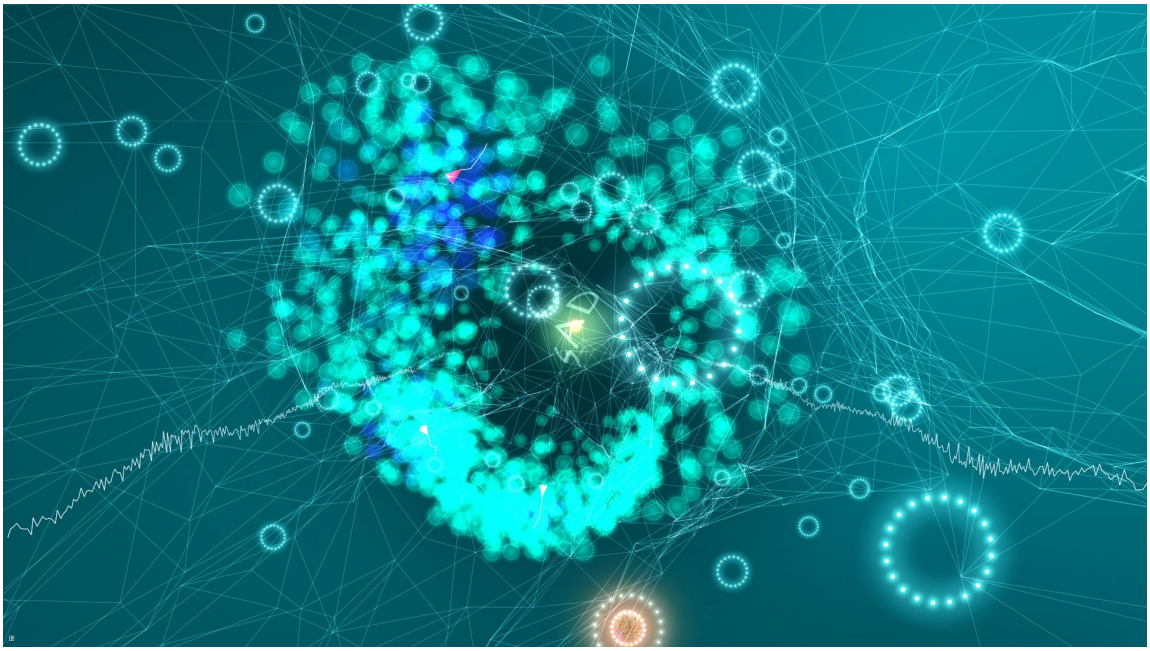

Figure 8: "Blowing Blues" section showing game play action **of blowing away emotions viruses and the "sad" word. Cells are the numerous cyan objects. The grouping of bluish cells indicates damage caused by vapor.**

Figure 8 above shows the word sad in the process of being blown away. The emotion virus enemies could also be represented as a scrunched ball of words entered previously in the Diary Box. This personalizes the experience since the player is getting rid of objects representative of their unique negative emotions.

“Blowing Blues” mind world objects.

Message Ring	Symbol of “data” that enters one's mind, leading to both positive and negative emotions.
Brain World	Representation of one's mind. It is “colored” with emotions by the message ring.
Emotion Virus	Primary enemy of the mind world.
Vapor	Objects spawned from emotion virus that attack the mind world cells.
Emotion Words	Words like anger, stress, or challenge that appear with the emotion virus object.
Cells	Symbolic of brain cells that the player must protect by blowing away emotion viruses and associated vapor and emotion word objects.

Blowing Blues using Head-Mounted Displays

Head-mounted display (HMDs) technologies are increasingly within reach of a broad consumer audience and emerging as a new way to experience interactive worlds and games. These display technologies have a history of use for training and health related applications such as in exposure therapy for treating veterans with Post-Traumatic Stress Disorder (PTSD). *Blowing Blues* takes inspiration from these applications and applies HMDs toward improving the user's engagement by relieving oneself of inner enemies. The application supports the “Socket” HMD, a low-cost open-source device developed at the Mixed Reality Lab at USC's Institute for Creative Technologies.[10] It offers high image quality, wide-field of view in a portable,

[10] http://projects.ict.usc.edu/mxr/diy/

lightweight, and user-friendly package. Blocking out the external stimuli of physical reality allows users to focus fully on the task at hand, experiencing only the audio-visual stimuli of symbolic visuals of their inner enemies and the surrounding mind world. The stereoscopic image in the HMD adds the dimension of depth to the experience. For example, when an “error message” is blown away, it is perceived in the HMD as going further away whereas on a traditional display, the message is seen as simply shrinking in size. An important feature of HMD use is user head tracking. In Blowing Blues' mind world, players can freely look around to target and blow out inner enemies. This enhances the feeling of being in the brain. Lastly, because players are moving their heads rather than remaining in a locked head position, it may help reduce the chance of neck strain.

Evaluation

An older version of the *Blowing Blues* section was shown at both the 2012 MeaingfulPlay conference, the 2012 Interactive Media Division MFA program Winter show, and the 2013 ESCoNS Conference[11] where it won the best software demo award.

Below is the informal feedback I received from players who tried the demo during these events:

1. Players were initially reluctant about physically blowing at the microphones. This may be because of fears of social acceptance of playing in a public setting. Conducting play tests in a private environment might help answer this question. Additionally, it became clear there was greater need for breath regulation to guide players away from the extremes of breathing rate and intensity. This would be most helpful to players with low lung capacity. Some players reported that they felt warmed up and even slight sweating after breathing intensely for more than thirty times. These players stated that after this physical exertion, they felt that a weight had been removed off their shoulders.

2. Players of older age seemed to enjoy the experience more than younger ones. Older players may have a deeper understanding of how emotions relate to health, or greater self-control.

3. The audience seemed to have little prior psychological knowledge of how breathing and emotional health relate to each other.

4. Players were extremely curious about the HMD and enjoyed the depth perception it offered. They felt head-tracking feature had interesting potential to add to the

[11] Entertainment Software and Cognitive Neurotherapeutics Society. (ESCONS)

experience.

5. Players enjoyed the visuals and felt it contributed to a more relaxing experience, but, some were confused about the meaning of certain objects like the “emotion viruses”. They felt the music was motivational and uplifting.

Play-tests are needed for the Diary Box section.

In the absence of a long-term study, it is unclear whether *Blowing Blues* can promote long-term behavior change towards greater emotional resilience. Further research and formal testing will help explore this potential.

Discussion

This project contributes to the field of interactive media by using breathing-based interaction and psychology research to create a personalized emotional health improvement system. It posits that journaling with data visualization elements combined with breathing based game-play can help users increase emotional self-knowledge and improve agency over negative emotions.

Further research is needed to test efficacy for short and long-term benefit. Translating psychological concepts into appropriate interaction mechanics may also be helpful. Another future research vector may include integration of basic theories in Eastern medicine and QiGong. Discoveries in these fields that further elucidate the relationship between emotions, health, and breathing may help inform new designs.

It may be useful to investigate how to better integrate journal use with users' preexisting online data entry habits such as blog or other social media use. This can increase the ease and frequency of journaling and could lead to a greater richness of affect-related data to further personalize the experience.

It may be useful to develop a feature to measure and record user lung capacity for breath exercise purposes. This can give players the ability to see changes in the breath data and potentially encourage them to improve their breathing capacity. Inspired by a design-based research approach, this project can lead to future exploration of the potential connections between one's lung capacity and emotional resilience. Within the larger sphere of mind-brain-body connection research, how does lung capacity affect one's ability to defend against negative psychological stimuli? How can health-related software applications use the possible connections between these physical and mental aspects to improve efficacy?

As touched upon briefly in the overview of *Sonic Cradle*, it may be possible for the player to translate breathing skill developed through playing the game to real-world health practice and daily life habits. For example, when the player is not playing, she can take deep breaths while visualizing negative emotions being blown away. The impact of tools like *Blowing Blues* on player's wider-ranging health habits is an avenue for future research.

Other Future Application Features

In future versions of the Diary Box, a whole year's worth of entries can be viewed as a time based data visualization in the form of a bar chart called the “river of emotions”. The horizontal axis is the time in units of days and the vertical axis measures the number of letters in each day's entry. Each bar is colored according to what hue the user previously chose to represent the emotional variability of a particular entry session. If the user writes everyday, the river of emotions will act as an “emotion photograph”, a record of your inner world history. Using color to represent the overall feelings embedded in daily entries allows hue changes from one day's entry to the next reflect shifting patterns of emotions over time. For example, the user may see a shift from red to blue over a period of several months, indicating feeling joyous in the summer and more gloomy in the winter. Outliers in the data or repeating patterns of color may indicate recurrent emotions, informing the player of what feelings to focus extra attention on. Overall, visualization is a tool to give perspective and personal insights to one's health improvement process.

Another feature for future development involves the transition from the journaling section to game play in the mind world. After creating their journal entries, if players feel they need more emotional processing, they can click a button called “wrap and blow”. The entries the player previously wrote can become a procedural animation of words clumped together into a scrunched-up “ball of words”. Then, the player can blow at the ball to enter the *Blowing Blues* mind world.

The *Blowing Blues* mind world emotion viruses can be further developed to rely less on words about emotions and visuals that are more symbolic. For instance, instead of the word sad, there could be a symbol of animated raindrops to indicate feeling gloomy. On the audio side, further work is needed to provide a greater variety of musical styles to match people's differing personalities and emotional needs.

Lastly, with the advent of increasingly powerful and sophisticated mobile devices such as smart-phones and tablets that include microphones and an array of other built-in sensors, *Blowing Blues* can be developed for these platforms as well to expand its potential audience.

Conclusion

In a period of increasing convergence of interactive media with personalized health care, there are new opportunities to explore forms of interactive media that go beyond entertainment applications. *Blowing Blues* uses interactive methods to help people to manage their own emotions. The *Diary Box* offers a space for people to organize and process their emotions. The data visualization of the “emotion river” is like a photographic recording of the patterns of one's emotional landscape. Breathing is an important tool to affect emotions. Meditation emphasizes focused breathing without distraction. *Blowing Blues* uses breathing in a different way that works with the power of suggestion to have players blow out the distracting emotions.

According to sociologist, Aaron Antonovsky, the sources of mental health include:

1. Understanding or comprehending the problem or stimuli.

2. Having the resources to deal with it.

3. Feeling that this challenge is meaningful or worthy of engagement.

The *Diary Box* helps users build self-awareness by providing a place to process and make sense of feelings. Blowing Blues tries to let players realize that bad messages can hurt mind and body and cause sickness. Players can blow away representations of their negative emotions. This cultivates an active “negativity fighting” attitude and a sense of having agency and the resources to self-treat. Fighting with inner enemies by blowing them out to heal the mind is a worthwhile mission. Moreover, the use of the language of interactive media makes psychological knowledge more easily accepted and engaging. The goal of *Blowing Blues* is to share

the knowledge of psychology in the ivory towers to the mainstream of daily life.

The effects of negative emotions are widespread. It is estimated that only about 17 percent of adults in the United States are considered to be in a state of optimum mental health.[12] This fact has far-reaching consequences because mental health is also deeply connected to physical and holistic health. There is evidence showing the link between chronic diseases such as diabetes, cancer, cardiovascular disease among others and mental disorders such as depression.[13] At its worst, negative emotional health can lead to death. Almost one million people die from suicide globally every year.[14]

This project is an attempt at designing a system to help improve people's emotion regulation. Better emotion regulation will bring a happier life.

[12] CDC Mental Health Basics

[13] Chapman, “The Vital Link Between Chronic Disease and Depressive Disorders.” 2005.

[14] WHO Suicide Prevention (SUPRE)

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