Cycles: A Serious Game for the Mental Health Literacy of Social Anxiety Disorder

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Abstract

Throughout my life, I never pondered why I did the things I did or wondered why I saw myself with the mental image I did. It wasn't until recently that I became more in tune with these inner machinations of my mind and set out to figure out exactly what I was going through. Eventually, I was officially diagnosed with social anxiety disorder (SAD), and for a moment, it felt like something had been unlocked deep within my brain. My suspicions were finally turned into something concrete that I could name. Thinking back, I began to wonder why my parents or friends or anyone in life never saw what was happening to me. To them, I was a normal kid with friends who did a variety of activities and had a plethora of hobbies; however, I knew that something seemed off. I began to question "How could I have known sooner," "What methods could be provided to help people understand their own forms of anxiety," and "How could I have helped my younger self?"

To answer these questions, I became interested in and began researching serious games and their applications in mental health literacy. Games were a big part of my life growing up, so I wanted to take this medium and shape it into something that I could not only find myself in, but also potentially help others facing the same challenges. This thesis project is the cumulation of my research into serious games, their variety of applications, and modern-day examples that have led me to create my own serious game: *Cycles*. This game is a reflection of what the social anxiety disorder (SAD) cycle was like for me, in the hopes that someone else will play it and understand more about me – as well as themselves.

Keywords: Serious Games, Mental Health Literacy, Social-Anxiety Disorder

Introduction

Up until high school, I always perceived myself as being able to make friends, or at least engage with any stranger that happened to come into my life. I never felt internal pressures or worries that would make me take a step back and reevaluate my approach, demeanor, or myself in general. It wasn't until high school that I started to realize that I didn't have that same level of confidence in my ability to connect with others anymore. Slowly, but surely, this doubt in myself grew and grew until I found myself worrying about social interactions and having to meet new people. A definite shift in my self-image had occurred, but it wasn't entirely clear to me why.

While social situations, and adapting to them, were becoming more difficult for me, I noticed that whenever I experienced similar interactions in a digital environment, I felt much more comfortable and at ease "opening up" to others and engaging with them. For me, video games, especially those that I played online, became a source of comfort, as well as an avenue for me to truly express myself in environments where my social anxiety wasn't as pronounced. For many years, this continued until I realized that I had started to adopt certain managing behaviors and my increasing self-doubt and worry led me to a point where it was a challenge for me to reach out to people who I could consider friends and talking to strangers was almost impossible. For the longest time, this sort of behavior seemed normal to me. I didn't think I had a mental illness, and I never brought it up to anyone else due to the personal sense of stigma I felt about this thought of "mental illness? Not me." It wasn't until late into high school and the beginning of college that I realized that something might not be right with my thought processes or managing behaviors and began to research and investigate where these feelings were coming from and what I could do about them.

According to the Anxiety and Depression Association of America, Anxiety disorders are the most common mental illness in the U.S., affecting 40 million adults in the United States age 18 and older (18.1% of the population) every year (2021). Anxiety disorders have a variety of available treatments including medication and cognitive-behavioral therapy, but only 36.9% of those suffering from anxiety disorders actually receive treatment (ADAA.org, 2021). Given the prevalence of anxiety disorders, a number of critical questions come to mind. Since anxiety disorders are so common, why isn't information regarding symptoms and treatment avenues given to us when we are younger? How could my own life and development have changed if I had been aware and diagnosed at an earlier age? Why wasn't mental health an important discussion topic at school or at home growing up?

It is often reported that stigma and medical costs are the two main reasons that individuals don't seek treatment (Andrade et al., 2014; Mechanic, 2002; Fox et al., 2018). Therefore, if the stigma surrounding mental illness can be lessened and the general population can become more informed and aware of the identification, treatment, and management of mental illness, then maybe we could see a societal change where kids having similar experiences to mine won't have to try and tackle these challenges later down the road.

One method of increasing the baseline of mental illness knowledge is by utilizing digital environments that are aimed at increasing mental health literacy. First defined by Jorm et al., mental health literacy is a combination of health literacy that refers specifically to the knowledge of mental health, wellbeing, symptoms, avenues of treatment, and professional services provided for mental health (1997). Alongside these other aspects of mental health literacy, the aspect that this thesis will be focusing on is digital environments that reduce stigma and prejudice towards

those suffering from mental illnesses (Jorm, 2000). An example of such an environment is Australia's Beyond Blue. Beyond Blue is a public charity supported by the Commonwealth of Australia and each Australian State and Territory (BeyondBlue.org, 2021), which provides resources and support, both online and in local communities, to anyone of any age that is currently suffering from or is curious about mental health. Beyond Blue has also been credited by Jorm et al. with increasing awareness around mental health literacy to the people of Australia (1997).

In addition to public charities, designers and publishers have begun releasing a number of mobile apps that aim to improve the mental health literacy of its users (Qu et al., 2020). Technologies like the Internet and cell phones provide a level of accessibility and engagement with users that allow them to access a plethora of resources in relation to mental health literacy; however, there is one type of digital environment that goes a step further and allows for users to actively engage and immerse themselves, offering a more effective approach to promoting mental health literacy: video games.

Although video games have been examined for their perceived influence on violent behavior, their ubiquity and popularity make them nonetheless important as tools for developing and reinforcing mental health. Instead, video games now act as important cultural artifacts and as means of expression, becoming epicenters of culture featuring a variety of mediums like music, films, and other forms of media creating transmedia experiences that go beyond just the console or computer (Dyer-Witheford, 2009). According to Flanagan and Nissenbaum, all games express and embody human values (2016), but while other forms of media serve similar ends, video games provide a way of instilling and bringing forth those types of values within players. Even

further, this growth of cultural influence presents developers with an opportunity and responsibility to reflect on the values that are expressed within games (Flanagan & Nissenbaum, 2016). Games can shape work, education, health care, mental health, and more.

With this information in mind, video games can serve as perfect digital environments for mental health literacy. If video games can instill and bring forth specific values and interests in their players, then they can instill the values of mental health literacy and bring a new level of awareness, engagement, and immersion into the realm of mental health, compared to other digital environments. There is, even now, an entire subgenre of video games called serious games that focus entirely on transferring some type of value or information to its players.

The point of this research is to examine and review the application of serious games in the realm of mental health literacy with a focus on social anxiety disorder (SAD) safety behaviors. Furthermore, this project will include the design and creation of a serious game that allows for players to engage with safety behaviors such as drawing attention to themselves, making eye contact, and raise their own internal awareness of them. While the complete treatment of SAD safety behaviors is beyond the scope of this project, the aim is to create a digital environment that adds to the baseline knowledge of the application and utilization of serious games within this mental health literacy space. Alongside the application, this paper will explore serious games, their applications in mental health literacy, current examples of serious games for mental health, and social anxiety disorder itself.

This project theorizes that serious games do, in fact, provide optimal digital environments for the mental health literacy of social anxiety safety behaviors. With their ability to actively engage and immerse players in an environment specifically designed for the transfer of these

values, serious games provide a safe and effective place for these behaviors to be worked through and potentially be treated. While the focus remains limited in scope for this project, the findings and research point toward a future where serious games could become a common digital environment utilized in all aspects of mental health literacy.

Literature Review

Section One: Serious Games and Mental Health Literacy

Literature in serious games is critical to understanding how they games impact mental health literacy. As such, it's important to address the emergence of serious games as a subgenre of games and their subsequent classifications, objectives, and applications within the games industry and across many fields and industries. According to a study done by scholars Michael and Chen, serious games are developed without entertainment as their primary purpose (2005). These types of games generally focus on education in some capacity as their primary purpose and value (2005); however, as serious games continuously become more prevalent in the continuum of games, what constitutes a serious game has also been changing due to the increasing variety of their gameplay mechanics, narratives, and aesthetics (Marsh, 2011).

According to a serious game meta-analysis by Boyle et al., serious games have been found to cover a broad field of topics such as science, health, and business, across several game genres like role-playing and simulation games, with a wide range of benefits, including encouraging behavioral changes, the development of real-world skills, and knowledge acquisition (2016). This research, in addition to that by Qian and Clark (2016) suggests that

serious games are ideal for teaching pertinent, modern-day skills such as communication, problem-solving, and scientific reasoning. Yet, the very definition and classification of serious games have produced some debate. One of the main arguments is that the use of the word serious gives off the impression that these games are inherently better or have a higher inherent value than most commercially produced games (Bogost, 2010). At the same time, the entertainment value of serious games creates a paradox. The question lies in whether the entertainment of a given game takes away from its educational value or vice versa. Marsh states that whether a game is educational, or entertaining, is not the primary concern for serious games, rather the focus should be on whether the game is successful in being persuasive or informative in conveying the core values of the developer to the player (2011).

From reviewing the current literature on the topic, researchers and developers see serious games as fun and enjoyable as any other game, but also are meaningful and educational (Marsh, 2011; Laamarti et al., 2014; Fitzgerald & Ratcliffe, 2020); however, the term “serious games” continues to create debate on the nature of serious games, where they fit into the realm of games overall, and whether their educative core detracts from the inherent "fun" aspect of games themselves. According to Ritterfeld et al. (2009), serious games have three potential outcomes: learning, personal development, and behavioral intervention. The first outcome, learning, is defined in Webster’s dictionary as "the acquisition of knowledge or skills through experience, study, or by being taught." In the case of serious games, this can be seen through simulation games where the players learn how to operate machinery, repair aircraft, or perform surgery all while in the game environment. The second outcome, personal development, focuses on the ability of gameplay, game mechanics, and narrative elements to help influence emotional

intelligence and identity formation through the situations presented to the player during gameplay. By presenting players with unique emotional and social situations, serious games cause players to confront and engage with their own internal identities and provide an avenue of exploration through the emotional elements present within the design. The third, and last, outcome of serious games is an intervention by the game on the player's views and behaviors. These interventions could be political, social, or mental in nature but aim to have the player actively engage with a belief of their own. Similar to the second outcome, the game design and mechanics are able to reflect the inherent belief that the developers are trying to transfer to the player. By providing them with a new perspective or a situation where the player engages with - and works through - a new belief, serious games grant players an opportunity to challenge themselves and their beliefs.

With these three possible outcomes in mind, serious games can be viewed in relation to multiple applications and subgenres, across a variety of different disciplines and areas of study. Scholars like Marsh and Laamarti et al. have shown that serious games have found themselves in areas such as academic games, business games, military training games, games for social change, and games related to health care (2011, 2014). Increasingly, serious games find themselves being embedded in a variety of areas of inquiry and cultural contexts with a huge variety in their purpose; however, the more diverse the purpose of these games, the more complex and nuanced the examination of serious games, and discourse surrounding them, needs to be. While this thesis will only be dealing with the utilization of serious games to promote the mental health literacy of safety behaviors related to SAD, it is important to keep in mind the range of purposes and aesthetics found within serious games.

With all of this in mind, how do serious games achieve this theorized transfer of values or knowledge, and how can this be useful in conveying mental health literacy? A serious game is engaging, drawing the attention and focus of its players, and repeatedly asking the player to actively engage in the desired outcome of the developer. This provides a positive feedback loop to encourage specific desired behaviors and necessitates that the players become emotionally invested in the narratives, characters, and obstacles that they are presented with (Ritterfeld et al., 2009). For mental health literacy, serious games provide a multitude of affordances that make them useful in the dissemination of information and in supporting the analysis of complex behaviors. According to Cheong et al., serious games provide users with virtual worlds or realms free from consequences that allow them to freely engage with behaviors without the potential repercussions of the real world (2011). They also allow us to interact with other users and the game environments in ways that are representative of the real world. The skills and mechanics found within these games can result in the users practicing and internalizing them, which can then be carried over and applied in real-world situations (Cheong et al., 2011).

However, with the opportunities and affordances that serious games bring to mental health literacy and learning environments, there are limits to their effectiveness as well as challenges that developers must overcome in order to transfer beneficial values to their users and players. The content of the games, regardless of their educational goals, tends to simplify the reality they are trying to convey. In the case of mental health literacy, this can result in the oversimplification of symptoms, treatments, and/or other vital information in regard to someone's mental health. If games portray the subject of mental illness, or mental health literacy, in such a way that provides the wrong kind of affordances, it could be damaging to the individual

playing (Fitzgerald & Ratcliffe, 2020). Also, video games (and, subsequently, serious games) constitute a fundamental part of the contemporary cultural landscape, thus serious games must be understood as commercial products that have the potential to "inculcate or challenge the established knowledge/power hierarchies" (Fisher, 2016). Therefore, the kinds of representation of mental health and illness that developers put into their games and digital environments can have the ability to harm or promote negative behavioral changes and thus must keep a level of awareness around the types of belief outcomes and representations at work within their own games.

Serious games are a subgenre of video games that have started to see an increase in prevalence across the game industry and others. With their primary purpose of conveying to the player some belief, information, or change in values, serious games provide apt digital environments for people to explore a variety of topics and challenge their own beliefs and behaviors. These affordances give serious games the ability to help increase mental health literacy in individuals by allowing them to become engaged and immersed in digital environments where they face no repercussions and can engage with narrative and aesthetic elements of specific mental illnesses. To better understand the importance of this, it’s important to look at current examples of digital environments and specific serious games that provide both positive and negative mental health literacy values through their game mechanics, narratives, and aesthetics.

Section Two: Review of Current Digital Environments and Serious Games for Mental Health Literacy

Digital environments have the capacity to provide users with experiences and information that can increase mental health literacy, across a variety of mental illnesses. While most of the digital environments discussed in this section will be serious games, other modalities of digital environments for mental health literacy will also be included to showcase the breadth and scope that exist. Serious games, as digital environments, provide a lot of affordances for the acquisition of modern-day skills and knowledge. With the increased proliferation of mental health awareness in today's world, mental health literacy should be considered a modern-day skill and is, therefore, an appropriate field for serious game development; however, such interventions in mental health literacy face numerous challenges in the development. As stated earlier, serious games (and games in general) have the power to do just as much harm as good, and developers need to be consciously aware of what values and beliefs they're embedding in their games.

One example of a non-serious game that focuses on mental health is *Moodgym* (moodgym.org, 2004, PC). *Moodgym* is an online cognitive behavioral therapy (CBT)-based course that has been shown to be effective in improving outcomes for those with early symptoms of mental illness, particularly in comparison to patients who haven't received treatment. (Twomey, 2014; moodgym.com, 2021). *Moodgym* is a self-directed online course broken into three modules that go into depth regarding the identification of mental illness and provides lessons regarding CBT-based coping mechanisms. There are many mobile applications for mental health literacy and practices; however, most of these mobile apps lack research-based examination, may not be backed by current evidence, and/or may present damaging information

to the user (Qu et al., 2020). Moreover, these digital environments often have high attrition rates and "dose" dependence; therefore, they are not considered suitable for primary treatment (Twomey, 2014; Schneider et al., 2014; Brijnath et al., 2016; Neary & Schueller, 2018).

Instead of trying to make these digital environments suitable for primary treatment, they are effective for improving mental health literacy, more specifically for supplemental treatment, management, and education (Fleming et al., 2017, Fitzgerald & Ratcliffe, 2020). Along these lines is *SPARX* (the University of Auckland, 2009, PC), a serious game designed for improving mental health literacy in adolescents (Merry et al., 2012). *SPARX* is a game and e-health therapy application developed for youth and is currently only available in New Zealand (sparx.org.nz, 2021). The game is divided into several levels, each focused on the acquisition of different skills related to mental health literacy (e.g., coping with emotions and problems) (Merry et al., 2012). *SPARX* has been shown to improve depression, anxiety, and quality of life significantly, with results persisting through to a three-month time point (Merry et al., 2012). Results from this study are promising and show the potential of a serious game directed towards youth mental health. However, another study using a variant of *SPARX* (*SPARX-R*) that focused on depression found that there were no significant changes in mental wellbeing or coping (Kuosmanen et al., 2017). This result was likely affected by high dropout rates and small sample size, but it touches on a problem with targeting digital environments to those with particular mental illnesses (Kuosmanen et al., 2017).

Serious games are an emerging field, and there are limited examples of research-based games for mental health. In their review, Fitzgerald and Ratcliffe found that current research games, including existing games and card games, were being used in research studies, which is

mirrored in an earlier review by Fleming et al. (Fleming et al., 2017, Fitzgerald & Ratcliffe, 2020). Interestingly, Fitzgerald and Ratcliffe noted that games with more complex game mechanics and design were favored by individuals in the study, stating that "[h]aving a choice and variety of options, appropriate levels of challenge, easy-to-follow instructions, and familiar, intuitive control devices corresponded to player enjoyment, confidence that they can play the game, and successful delivery of intervention outcomes" (Fitzgerald & Ratcliffe, 2020). To address the challenge of quality and design in digital environments and serious games for mental health literacy, it is important to look at some of the most popular and current serious games and applications aimed at mental health literacy.

Florence

On the surface, *Florence* is a beautifully designed and touching game detailing the beginnings of and subsequent end of a couple's relationship (Annapurna Interactive, 2018, PC & Mobile). While on the surface, the game may not be directly related to mental health, it does go into depth exploring the feelings of grief and loss surrounding the end of a relationship. Grief and loss in themselves are not mental illnesses, but they do play a vital role in someone's mental state (Beyond Blue, 2021). However, the game also uses this narrative to show the positive side of a tumultuous event like a breakup. While *Florence* shows the grief associated with it, it also shows how someone can go through personal growth and acceptance.

Florence is a predominantly visual game that utilizes minimalistic aesthetic choices, straightforward game mechanics, and graphic and visual metaphors to flesh out the narrative of the game. The art style consists of muted tones and bright colors highlighted by lines that frame

the characters and game objects. The game's aesthetics do a shift in quality whenever the perspective changes between the characters or different environments; however, these shifts do not detract from the main flow of the game and work well together. Originally, *Florence* was created to be a mobile game but was ultimately reconfigured for computer use. The game uses simple mouse or swipe gestures to browse through comics and complete various puzzles. The only pitfall of this design is the lack of any text or verbal dialogue between the characters, which can lead to some confusion regarding the dynamics between the couple. While the gameplay is simple, the emotional expression of the game still creates an engaging and touching narrative dealing with the topic of mental health and can thus provide users with literacy around the personal effects and growth that can come from emotional experience.

Coming Out Simulator

Coming Out Simulator details a story of a young man who is struggling with coming out as gay to his parents. The game has a focus on the internal fear, loss, and loneliness that's associated with hiding from one's parents, actually coming out, and finally, the acceptance of it all (Nicky Case, 2014, PC). Like *Florence*, *Coming Out Simulator* is a short game with a minimalist aesthetic that proves that short games can still have a very engaging and touching emotional impact on its players. The narrative of the game is delivered in short, sentence-like stories detailing the progression of events that the main character is experiencing.

The aesthetics of the game relies heavily on two to three-toned line art with faceless characters, while dialogue is shown in colored text boxes that are overlaid on the background and characters with narrative options given at the bottom of the screen in a small grey area that

blends in with the other visuals. The visuals remain simple and don't take away from the emotional impact of the game; however, if the characters had faces that were able to show emotions visually, an extra layer of emotional depth could have been reached. The gameplay mechanics are very simple and solely revolve around navigating different player dialogue options; however, this design raises questions about whether this is more of an interactive narrative or a serious game since these options don't provide different outcomes for the player.

Coming Out Simulator is a straightforward and short game that utilizes an interesting graphical user interface to give the player some sense of agency within the game. While the game's outcome does not change depending on player choices, it still provides an impactful and positive representation of LGBTQ+ characters and the struggle they might face in their own personal relationships and lives. The game provides mental health literacy by looking at individuals suffering from similar situations and allows for an exploration of experiences that could be personal for the player.

Depression Quest

While it has been surrounded by a great deal of controversy than the other games, *Depression Quest* is an excellent example of mental health-oriented gameplay. *Depression Quest* is a text-based, choose your own adventure-style game that primarily focuses on the everyday struggles and challenges of a twenty-something-year-old person suffering from chronic depression (The Quinnspiracy, 2013, PC). As the game progresses, player choices ultimately affect the symptoms that the character experiences and, thus, change the different avenues the player can explore. Due to the text-based style of the game, its aesthetics remain very minimal.

What aesthetic objects exist are largely limited to text, a textured grey background, and hyperlink choices that the player can make. Alongside these, a sidebar exists that provides the game's title and some exposition on the game itself, brief images that represent different events and times within the narrative, and a tracking system made from grey boxes.

The mechanics of the game result from narrative-based choices that do ultimately affect the characters and outcomes of the story, resulting in multiple potential endings. The choices that the player makes result in the character's depression levels to either increase or decrease and can lead to some narrative choices being included or marked out depending on the level of user character depression and if treatment has been sought out. This type of gameplay is a good example of how mechanics can help communicate ideas within the story, i.e., symptoms improving or getting worse. *Depression Quest* does well in providing mental health literacy on how depression can affect someone's everyday choices, and the range of choices available to us when navigating these situations. The game was inspired by the developers own personal experiences with mental illness, so the authenticity of the events that transpire throughout hold real emotional value; however, the game, being text-based, provides a lot for the player to read and isn't quite as emotionally impactful as the previously mentioned games, which could result in players not being fully engaged with the values and information that the developer is trying to get across.

Actual Sunlight

As mentioned earlier in this section, the types of values and agency that we provide to players when dealing with mental health illnesses in serious games are important and need to be carefully considered. *Actual Sunlight* provides a somewhat intense look at mental illness and explores suicidal ideation, depression, and the effects of being overworked (WZOGI, 2014, PC, Mobile, & Console). The game focuses on the player character Evan Winters as he goes through his monotonous everyday life that's devoid of all pleasure. The game was made to feel and play like an RPG where you follow through with Evan's pain, mental illness, and internal dialogue. Ultimately, after living through Evan's life and confronting the internal dialogue over his reasons for suicide, the player experiences Evan's suicide through the metaphor of sunlight and being released.

The game was made in RPG Maker, so it has the accompanying pixel graphics and aesthetics with all environments and characters being fully designed pixel art. Throughout the game, there are hand-drawn images of Evan and story moments to provide a bit more of a cinematic experience to these moments. Unlike the other games on this list, *Actual Sunlight* doesn't use colors or metaphors to express ideas and emotions except in the case of comparing suicide to that of sunlight. The mechanics of this game aid it to be a walking simulator type of serious game where the player interacts with different characters and objects to discover a variety of story elements. The player also controls Evan from a top-down perspective, like that of classic RPGs.

From a literacy standpoint, this game does a great job at representing what it could be like for someone suffering from depression is experiencing their daily life similar to that of

Depression Quest with a bit more depth and emotional engagement behind it due to the narrative elements that are placed throughout; however, the real issue of this game is the ending metaphor of suicide being similar to that of release and sunlight. This type of representation can have particularly harmful effects on players who are currently suffering from suicidal ideation themselves. Alongside the metaphor itself is the lack of support that the game provides for its main character. This could insinuate that there are no solutions, and therefore the release is the only viable option.

Actual Sunlight provides a game that showcases a potential reality for someone that is suffering from depression and suicidal ideation. The game provides an account of the internal dialogue that these individuals might go through; however, the values and solutions presented to the player to deal with these illnesses are more harmful than beneficial.

The Suicide of Rachel Foster

The Suicide of Rachel Foster is a mystery horror game that follows the main character, Nicole, as she returns to the hotel that her parents own after the tragic suicide of a girl named Rachel occurred (Daedalic Entertainment, 2019, PC & Console). The game begins by establishing an interesting hook with its mystery elements and creates a creepy atmosphere as you explore the hotel looking for clues and information on the tragedy that occurred. However, this game is rife with poorly dealt with, sensitive topics, the most intense one being that the game puts players through the motions and ideations of suicide and subsequently provides the players with a chance to follow through on these ideations (Daedalic Entertainment, 2019).

Unlike the other games in this section, *The Suicide of Rachel Foster* is a three-dimensional game that utilizes more realistic aesthetics in its design. The hotel that the player walks through is well designed, and the combination of the game's visual and audio aspects do well at creating a tense and creepy atmosphere as you explore.

The mechanics of the game are fairly basic and similar to most other walking simulator games. The player can walk around the hotel and interact with a variety of different objects to trigger story elements and gather information. Alongside this, the character has access to a phone where she can talk to the deceased Rachel's brother, Irving. This is the source of most of the dialogue throughout the game, as the rest relies on the objects that are interacted with.

However, the mental health literacy within the game is astoundingly harmful. The game actively has players go through suicide ideation with no offer of solutions or help to the character, actively has the player plan out and gather the materials and information needed to complete their own suicide, and then puts the players in that situation themselves where they either must follow through with the suicide by staying in a monoxide-filled car or by getting out and being stuck in the hotel forever. Unlike *Actual Sunlight*, this game does not use any metaphors for suicide and presents a very real and traumatic choice for the player to make. The use of suicide as a plot device and game mechanic gives the impression that suicide is like a game and provides a method of how to carry it out.

While the aesthetics of the design of the game accomplish the mood the game is trying to set, the actual mechanics and mental health literacy values that the game expresses provide a very tricky and potentially dangerous sentiment to its players.

One avenue that this thesis and accompanying project will explore will be the added use of virtual reality (VR). With the serious games and other digital environments listed above, one can see that none of them utilize VR in their game design or aesthetics. An analysis done by Wu et al. showed that VR-assisted therapy showcased similar and improved results to that of regular therapy (2021). In another study done by Kim et al., results showed that VR-assisted therapy showcased high effectiveness in skill and information retention pertaining to patients with social anxiety disorder (2020). VR allows for patients to engage and practice coping mechanisms in a safe, digital environment. By utilizing this level of immersion, this thesis, and serious games in general, would benefit from the enhanced levels of agency that it provides to the players. The immersion of VR in combination with the engagement of games could create a state of play within the player that would result in an efficiency higher than using either on their own.

When creating digital environments, there are a variety of challenges, including limited funding, small development teams, a need for broad and specific expertise, and limited examples for development within the larger industry. These challenges can lead to issues in quality of studies, aesthetics, and the games themselves; however, when creating one of these digital environments for mental health literacy, there are more challenges that present themselves. One of the most important is how the developers relate and present their values to their intended audiences.

In the modern-day, there have been both commercially built and purpose-built digital environments to target those who have a mental illness. Both of these types of environments have seen success and show promise; however, they each have their own advantages and limitations. Commercially built digital environments usually have the advantage of being more

engaging with higher quality aesthetics and design; however, their focus on entertainment takes away from the literacy values that are identified from reaching their target audience. On the other hand, the purpose-built digital environments have the advantage of being backed by a broad range of knowledge and expertise and are often examined for their effectiveness; however, this usually results in poor game design and mechanics and leads to a less widespread and engaged audience.

One option of inspiration to find this balance is serious games. Serious games that explore both lived experiences of mental illness and present engaging emotionally impactful stories of grief, loss, loneliness, and trauma provide unique environments and experiences through the creation of realistic and complex characters. Many of these games are created outside of research studies or clinical settings but still contain serious content and values that can be transferred to the player. Serious games are not perfect and can contain flaws in their mechanics, representations, and aesthetics, but they provide a unique opportunity for developers to help people through them.

Stigma often characterizes mental health and those suffering from mental health illness as violent, crazy, and insane. To counter these stigmas, developers can use the characters and narratives in their games to provide informed, human, relatable, and honest representations of individuals suffering from these illnesses, which can lead to an increase in mental health literacy of these illnesses resulting in these stigmas to be dropped finally. The values that developers provide in their digital environments and serious games for mental health literacy are highly important, not something to be taken lightly as it's never known the kind of effect that it might have on someone.

The next section of the literature review will have a focus on current serious game applications for social anxiety disorder, some of the most common safety behaviors related to it, and current treatments.

Section Three: Social Anxiety Disorder: Safety Behaviors and Current Serious Game Applications

Social anxiety disorder, SAD, is a social phobia characterized by a strong desire to make a favorable impression on others with accompanying insecurity about their ability to do so (Purdon, 2001). This can lead to individuals suffering from SAD being more focused on how they interpret how others perceive and evaluate them, instead of focusing on the social interaction itself (Purdon, 2001). This tendency of internal focus can lead the individual to construct negative self-images and develop anxiety about participating in future social situations.

Researchers Clark and Wells suggest that there are several cognitive and behavioral mechanisms at work that serve to help maintain the disorder (1995). One of these mechanisms is that social phobics utilize what is commonly referred to as "safety behaviors." A safety behavior, as defined by Salkovskis, is a behavior that is performed to help prevent or minimize a feared social blunder or outcome and can help explain why these behaviors don't go away even when the feared blunder does not occur (1991). Common examples of safety behaviors include trying not to draw attention to oneself, not making eye contact, and talking less.

These safety behaviors present three separate mechanisms that help in maintaining the distorted thinking and need for the behaviors: the worsening of symptoms, prevention of disconfirmation, and contamination of social situations (Wells, 1997). First, safety behaviors can

potentially increase the likelihood of the feared anxiety or outcome i.e., not making eye contact leading to less engagement from others or holding a glass tightly to prevent shaking resulting in more shaking. Secondly, social phobics prevent themselves from confirming that they don't need the behavior because they generally constitute the safety behavior to the nonoccurrence of the feared social outcome. Last, safety behaviors might become more noticeable or result in a worse situation than what they feared. If a social phobic tries to not draw attention to themselves to avoid embarrassment, this could lead others to think that person isn't interested or engaged with the situation (Wells, 1997).

The question then becomes why do these individuals continue to practice these behaviors if it's shown that they lead to more negative social outcomes and further exacerbate the anxiety itself? It could be that some individuals are not aware of their reliance on safety behaviors; however, as mentioned above, these individuals usually attribute the lack of a feared outcome to the safety behavior itself. Another possible explanation could be that these individuals view safety behaviors as a positive way of coping and believe that they actually minimize or prevent any feared outcome (Heimberg et al., 2014). However, as research has shown, these behaviors result in the opposite of the individual's belief and can have a long-lasting negative effect on themselves and their ability to interact in social situations (Stangier et al., 2006).

Now that we've established the "what, how, and why" of safety behaviors, it is important to delve into the realm of treatment for the behaviors. With the behaviors themselves being so ingrained into an individual's personally acceptable behaviors, the question of how to help people with them becomes important. Clark and Wells (1995) were the first set of researchers to examine the role of safety behaviors in the treatment of SAD, and over the past 20 years, other

researchers have replicated and done their own types of studies into them. Morgan and Raffle conducted a study where a group of individuals suffering from SAD were given "psychoeducation" about safety behaviors and were instructed to drop them and prevent themselves from using them (1999). Another study by Schmidt et al., utilized what they called the False Safety Behavior Elimination Therapy method where safety behaviors were identified and eliminated by encouraging individuals to participate in activities and behaviors that go against the safety behavior i.e., drawing attention to oneself, making eye contact, interrupting a conversation, etc (2012). In both studies, there were control groups that didn't receive the same instructions and continued regular treatment for SAD. All groups in both studies experienced lessened anxiety and safety behaviors; however, the groups that received the specific safety behavior test methods experienced a much more drastic drop in the use of safety behaviors.

These studies, and others, show that exposure therapy combined with active engagement and dropping of safety behaviors can lead to a larger decrease in safety behaviors and result in a stronger self-perception when it comes to social situations. However, exposure to these real-life scenarios might not be possible whether in natural settings or clinical. As expressed before, serious games provide many affordances that can result in the transmission of skills, lessons, information, and values. This means that serious games have a prime opportunity to help these individuals with SAD to actively be engaged and exposed to the safety behaviors themselves in a digital environment free from repercussions.

Recently, there has been a rise in studies and clinical trials aimed at testing the validity of both the use of serious games in the treatment of SAD. As outlined by Fleming et al., there are six different types of serious games for mental health, with applications for SAD already existing

within those types (2017); however, these applications focus primarily on providing participants with exercises and community support in relation to specific treatments. There is still a lack of serious games specifically concerned with improving the awareness, engagement, and overall mental health literacy of the player with SAD-related safety behaviors.

The benefit of using serious games in relation to the engagement and with mental health literacy of SAD and other mental health issues has been extensively covered in recent times (Báldy, 2021; Beidel, 2021; David et al., 2020; Fleming, 2017); however, these randomized controlled trials (RCTs) all have taken place in highly controlled environments and clinical settings where the goal was to provide more quantitative results instead of measuring the levels of awareness or engagement the players experienced post-game. There have been studies focused on measuring the correlation between players' flow states and their immediate learning gains in the context of serious games (Brom et al. 2014), where there was a positive correlation between the two.

Many of the serious games for the treatment of SAD also run into the problem of having to disrupt the gameplay to have the player answer questions about the game or waiting until the player is finished when they may not be able to recall quite as much information or emotional states that they may have experienced throughout (Ravaja, 2004). This brings up an issue of how to measure a player's engagement with a game and the values it's trying to get across. Engagement in itself is already a complex process dependent on a multitude of factors, and within the context of serious games where something needs to be learned, it adds an extra layer as learning is also a complex state of mind, dependent on a variety of factors as well (Hookham et al., 2016).

As stated in the previous section, serious games for mental health literacy, and by extension SAD-related safety behaviors, are posed with these unique challenges of trying to accurately assess and evaluate just how well these games do with engaging its players in the specific behaviors. There needs to be a careful balance between all aspects of the game design to create a digital environment that is suitable for the supplemental or full treatment of SAD.

Conclusion:

What needs to be remembered is that serious games and mental health literacy are both topics that are still somewhat new to the general populace. Before, games were meant solely for entertainment purposes and the stigma surrounding mental health might be less today, but still remains a relevant problem (HealthPartners, 2020). What is presented to us is an avenue to combine these two topics and use them to bring out the best in the other. There already exist other digital environments that are aimed at mental health literacy that exist as mobile applications, websites, and others; however, these types of environments lack the levels of agency, engagement, and activity that are provided by serious games. Serious games allow for developers to create worlds and characters that accurately represent the real, humane, informed world of mental illness and the people that experience them to allow people to play through and form better understandings of these heavily stigmatized illnesses. In return, they educate the players about these mental illnesses that can further reduce the stigma surrounding them.

There are lots of examples out in the world and mentioned in this literature review detailing the variety of methods, ideas, and game design choices that developers have made to represent mental illness and transfer their own forms of information and literacy. Some of these

examples provide better literacy than others but both are important to understand and be aware of when considering the game design of a mental health literacy serious game.

My project has the aim of being a representation of what a fully fleshed-out serious game could look like for the mental health literacy of SAD-related safety behaviors. It will utilize everything learned from the research and examples listed in this section to utilize the best aesthetical and mechanical design choices to create a beneficial environment for the literacy of safety behaviors.

If developers continue down this path of creating games for the sake of others and our communities, then games have the potential to become even more of a cultural necessity than we could have ever imagined.

Creative Work

The accompanying creative work for this thesis is a serious game based around the primary goal of using puzzle logic, in combination with aspects of a walking simulator, to experience a surrealist and dream-like experience that is meant to capture various aspects of the SAD cycle. As users progress through the game, the levels each represent a different point of the SAD cycle, including the experience of anxiety, working through and developing safety behaviors, self-reflection, and the choice to try and better oneself. This serious game consists of an opening, two playable levels, and an ending with a total playtime of about twenty to thirty minutes. The following written portion discussing the creative thesis project acts as a breakdown of the aesthetics and mechanics of the game, offering documentation of the game assets, as well as an exploration of their intended meaning in the context of the individual game levels and the game overall.

Pre-Production

When developing a project based on serious games, I felt that there would be no better way to showcase my findings than to make a serious game myself. Though I had made small, simple games in the past, I wanted to challenge myself and try to develop a digital game that would be more in line with what one would expect from a more commercially-viable product. However, with my current developer skills and available resources, I knew that the creative piece would have to be a smaller, more representational "proof of concept" version of what a more fully developed game could be. My vision for this project was to make a fictional walking simulator that utilizes puzzle logic to progress through each level, each of which represent one of the various points in the SAD cycle, with the full game acting as a journey through the entire cycle.

While the focus of the game is its mechanics, and how those can be interpreted representationally and philosophically as elements of SAD, I wanted the game to also look and feel like it was an immersive aesthetic experience as well. To truly capture the immersive capabilities of VR, I created and used a more realistic level design to help encourage player engagement with the digital environments and puzzles even further. To support this, I have used as many found or free assets as possible, many of which were found in the free or purchased section of the Unreal Marketplace. These asset sets were used to create the levels; however, I thought that this might cause some discrepancy between the differing aesthetics of the levels, an issue that I solved by setting the narrative within a dreamscape. By doing so, the major aesthetic

transitions between levels make sense, as our dreams are all unique. This design and supporting narrative also reinforce the larger theoretical idea at play. As the player character uses their dreams to work through the puzzles/behaviors, the real-world player is able to use the game experience to reflect on their own lives.

Opening Level - Bedroom (Night)

The game begins with a moving camera shot slowly wandering through a seemingly endless night-drenched stack of apartments. Eventually, the camera zooms into one apartment where it does a 180-degree pan to settle on a shot looking at the inside of an apartment and out the bedroom window. With the same ending shot in view, the game begins, and the player's controls become active. I began this opening sequence with this slow, dolly shot to act as an opening shot and to play the player into the world, but also to start building a feeling of apprehension and anxiety for the player. The stack of apartments is bathed in darkness with little light coming from within them to indicate a sense of loneliness and being lost. The ending pan in this sequence represents the camera going from a passive observer of the environment to becoming an active player within the apartment.

At this point, the player has control over the character and can freely move about the apartment. The apartment is small, and there isn't much room to move around. The aesthetics of the inside are meant to closely resemble an apartment that could exist in the near future (similar to what one could imagine existing in *Blade Runner* or *Cyberpunk 2077*). The enclosed space of the apartment further envelops the player in a cloud of anxiety and loneliness, as there continue to be no other signs of life in this environment beyond their own. This opening level is meant to

act as a starting point for the game, but also for what SAD can feel like. The overbearing darkness in conjunction with the inescapable apartment acts as a physical representation of what being trapped within your own mind can be like.

Looking around the room, the player sees a variety of assets and components that make up this small and enclosed space. On one side of the room rests a set of monitors and computer towers that make up most of the room. Some of the monitors remain still emanating a bleak, blue glow, while others have different websites pulled up on them. Upon closer inspection, one can see that the browsers have pulled up different websites that are detailing a different aspect of social anxiety. On the other side of the room are situated the character's bed and a shower. Hung up on the wall next to the bed, sporadically placed along the wall, are child-like drawings. Once the player has moved freely around the enclosed space for some time, a phone on the computer desk begins to vibrate, pulling the player back over to that side of the room. Upon picking up the phone, the player sees dialogue appear on the screen, with accompanying voice-over, which plays on its own. What ensues is a one-sided "conversation" between the player and an unnamed character that gives off the impression of being a close friend. The content of the "call" will be the friend checking in on the player character because they haven't heard from them in a while. This is indicative of the toll that SAD can take on one's mental health and helps symbolize how some people tend to withdraw from others whenever they're suffering from a particularly bad bout of anxiety. Throughout the conversation, the player will not have any agency or choice to reply to the messages. After the end of this sequence, the player has the option to continue to explore the apartment, but once they click on the pillow resting on the bed, a short cutscene

ensues where the player lies down in the bed to sleep off their anxiety and initiate the start of the dream levels.

Jungle Temple Level

Though the apartment does offer some player movement, the next level is the first truly "playable" experience, where there is more to do than just looking around and watching the phone conversation. In stark contrast to the opening level, the Jungle Temple features a brightly lit and nature-filled environment, including a clearing in the middle of a jungle area. In the center of the clearing rests an ancient temple that, despite nature's best attempts to retake it, seemingly has been there for as long as time. With these aesthetic elements in place, I wanted this level to provide the player with a more calming and uplifting atmosphere. I chose this dichotomy between the apartment and jungle because I wanted to try and capture a sense of escapism from the anxiety-riddled cramped space at the beginning - like how someone with SAD might try and escape anxiety-inducing situations like the text conversation from the opening level.

The jungle space is also meant to embody the specific safety behavior of drawing attention to oneself and sharing something personal. To accomplish this, I placed five different monsters around the map that each require a different item to be brought to them, found scattered around the map. Each of the monsters have a different voiceover to help insinuate that they are different entities while also showcasing the variety of human personality as well. When the player interacts with these monsters, each of them asks the player to bring them a specific item related to the player character in some way. One asks for something important to the player's childhood, like a toy, whereas another asks for something creative they made, like a painting. To

pass through the level, the player must bring all five of these monsters their specific item. Whenever the item comes into contact with the monster, the monster will imbue their energy into the player and disappear from the map. Once the player helps all five of the monsters disappears, this opens a door at the top of the temple that allows the player to pass through and continue onto the next level. If the player looks closely at the items the monsters desire, they'll realize that these items were all seen in the opening level of the cyberpunk room. This further illustrates the transference of something personal between the player and the monster. By doing so, the player is overcoming a common safety behavior of not drawing attention to oneself. By actively engaging and starting this interaction, the player is being shown that becoming personable, even with a monster, is the proper way to overcome this level and thusly, the proper way to overcome the safety behavior in real life.

I chose the design and aesthetics of these levels for a multitude of reasons. I wanted the temple level to represent how once you get into the subconscious mind, the thoughts, fears, and anxieties that come from the apartment, or the conscious mind, seem to disappear under the canopy of the luscious, nature-filled jungle. This is an indication of how social anxiety is heavily influenced by conscious thoughts and our own perceptions of ourselves and our environments; however, this is not to say that our subconscious mind isn't influenced by anxieties. I chose the "enemies" of the level to be monsters to indicate that despite the calming and comforting nature of our environment, interactions with others can still be quite frightening or difficult to do. By making the player draw the attention of the enemies to themselves, it allows for the player to embody anti-safe behavior and use it for their own benefit (hopefully bringing that with them outside of the game).

Old House Level

The other playable level consists of an older townhome that the player can navigate through. The level circles back to an aesthetic feeling more reminiscent of the opening apartment level, with the house meant to invoke a sort of eerie and nerve-racking effect. This level is also quiet and devoid of any other life, further enunciating its loneliness. The player begins outside of the gate that surrounds the brightly lit-up house. Looking around the space, there is almost nothing else in the level besides this one house. Thus, the player gravitates towards entering the house and exploring its contents. The inside of the house matches the design of something in the suburbs of a southern state. The home features numerous examples of religious iconography and other generic home assets and is composed of two stories featuring a living room, kitchen, family room, bathroom, and multiple bedrooms. A quick walkthrough shows that all of the doors within the house are openable for the player except for one at the top of the stairs, on the second floor.

Upon further exploration, the player finds that certain items located around the house twinkle ever so slightly whenever the player gets within a certain distance to them, indicating that these items are important to the level, rather than just generic elements of the house design. With closer inspection, players should be able to see that these are some of the same items found in the apartment and jungle levels and some being completely new to the player. When the player picks up these objects, a brief voice-over with dialogue appears on the screen that conveys the player-character's own thoughts and reflections on what the items mean in that moment, rather than an actual conversation between them and someone else. This level is meant to be representative of a process of self-reflection within the player, as a way to explore their own

social anxiety. With each item, the character reflects on a different aspect of their life, so to speak. The items are scattered throughout the level, so after exploring the entirety of the house and picking all of them up, the locked door on the top floor of the house becomes operable, allowing the player to pass through and reach the ending sequence of the game.

Ending Level - Bedroom (Morning)

The ending and final level to the game consists of a brief period back in the same apartment as the opening level; however, this time the room is brighter and the time on the computer screens shows it is no longer late at night, but it is instead now morning. This time change was picked for two different reasons. One, to showcase the actual passing of time in-game, but it also acts as a symbolic resolution to the overall narrative of the social anxiety cycle. The bright morning showcases that there is a brighter future ahead for people suffering from social anxiety disorder. The brighter, more relaxed atmosphere and mood act as a stark contrast to the dark, gloomy room from the beginning of the game; however, gameplay-wise, there still won't be much to do in this level.

After "waking up," the character's phone begins to ring once more. Upon picking up the phone this time, the friend who reached out the night before will ask the character again whether they're doing alright. At this point, the player is presented a choice: do they want to go meet the friend, or do they ignore the message and go back to sleep. This choice acts as the penultimate culmination of the social anxiety cycle. After going through all the other experiences of the game, it ultimately comes down to us deciding whether or not to try and make each day better than the one before it. Depending on what the player chooses, they will be presented with two

different screens or endings. If the player chooses to leave the apartment and meet up by interacting with the door, the player will be directed to the End screen, indicating that they were able to break free from the SAD-cycle that they were originally trapped in. Alternatively, the player may choose to interact with the pillow on the bed again. By doing so, the player will go back to sleep and wake up once more in the opening level at the beginning of the game. This choice puts the player and character right back into the SAD-cycle, indicating that the "right" way to win is by breaking free from that by leaving the apartment.

Conclusion

I knew from the beginning that this was going to be one of the hardest and most taxing projects that I've ever decided to take on. Before this project, I had only ever made smaller, much less complex games and VR walk-through experiences, so combining the two to make a VR game seemed like the next logical step; however, it was not an easy undertaking. This project has not only pushed me as a developer but also as an academic and a creative in ways that I would have never imagined. The level design portions of this creative project provided me with an easy start to this project; however, I quickly realized that the rest of the project was going to be one huge hurdle after another as I tried to bring my vision to life.

I never thought I would be giving up almost all other aspects of my social and personal lives to try and accomplish this huge thesis. Between working a full-time job and the full-time job this project became, it felt like there was no room for anything else in my life; however, that's not necessarily a bad thing. This project has shown me that to accomplish something we truly want, lots of time, dedication, and action are required.

Throughout this project, I was also able to incorporate lots of skills that I had learned throughout my time at CU. Beyond the inherent skills of game design that video games require, this project allowed me to bring in previous knowledge of video and audio editing, typography, critical analysis, and general design workflows. By being able to utilize what my degree set out to teach me, I got this inner sense of accomplishment and fulfillment from this project. That I actually was able to put my all into it with every tool I had at my disposal. The skills and knowledge that I will be taking with me forward will be ones that I'm positive will not only help me in my professional career but also in my personal life as well.

Discussion

When I first started this thesis, I was unaware of just how much my initial ideas and plans would have to change and be altered throughout the course of the project. I've always found myself drawn to the medium of video games, so I knew that it was the direction I wanted to head in, but I was unaware of just how much refinement and polishing would need to be done to complete this project. I went into this experience imagining myself doing something very broad, encompassing a much more academic posture and distance from the work itself; however, this thesis has become something of a self-reflection. Creating a game about abstract representations of SAD, and related aspects of it, in turn made me ponder just how much of this game is about myself and the safety behaviors I cling onto in my personal life, as opposed to other players who are experiencing the same thing.

In the written component of this thesis, I analyzed a variety of serious games that have either a direct focus on mental health or that contain themes relating to mental health so that I could use their game design to inform my own choices during the development process. From what I found during my research, lots of games that deal with mental health utilize elements and themes of mental health in a very direct way, either in their overall narrative or actual gameplay mechanics. For my thesis, I knew I needed to pull away from these similarities and reimagine how these overall themes would be incorporated into my game in a way that balances meaning and gameplay. Additionally, trying to find this balance within the realm of VR added an extra layer of challenge to me, but also helped push this thesis into a realm beyond other similar projects.

To find this balance, I had to be meticulous in level design, focusing on every detail found in each level to tie them to one another, while also being aware of how every level contributes to the overall narrative and theme of the game itself. Since the game is not geared towards, or meant to be, an actual treatment for social anxiety, I needed to make sure that the game was relatable enough to be a ubiquitous experience for anyone who plays it. At the same time, though, I wanted it to be abstract and not based in reality so that anyone could feel themselves being placed into the world of the game.

To do this, I decided to make the opening sequence a “cyberpunk” apartment bedroom. A bedroom is a relatable space to almost anyone, but by making it a futuristic, cyberpunk-themed room, the level emotes a kind of distance needed for the project. It makes it so that the space could be anyone’s bedroom, while also beginning to capture the overall surrealist aesthetic that I hoped to express throughout this project. When looking around the bedroom, there is an

immediate sensation of tightness as the room itself is only one small cell out of a number in a larger tower of similar apartments. I wanted this room to capture a sense of loneliness and separation from the rest of the world. This sort of atmosphere was crafted to help represent and capture the same kind of feeling that someone experiencing social anxiety might feel; largely a sense of being trapped within themselves with no way out. To further embolden this feeling, some of the computer monitors in the room have different websites pulled up dealing with social anxiety in general, safety behaviors, and some simple coping mechanisms. This provides an extra layer of visual information to the player that the character that they are embodying is currently struggling with social anxiety themselves. Shortly after entering the level, the character's phone begins to ring. The character enters a brief, one-sided conversation with a friend who wants to check up on them, but the game doesn't give the character an option to respond. This scene is an important aspect of the game's themes and narratives overall but is also an important moment for me as the creator. Whenever I begin to experience an excessive amount of social anxiety, responding to messages or calls becomes this almost impossible hurdle for me. I begin to draw back within myself and not reach out to others just as how, in the game, the character is stuck and withdrawn inside their cramped room with no other signs of life around besides receiving these messages. Right after this, the player goes to sleep, where their dreams and subconscious begin to help them process different aspects of their anxiety.

Upon waking, the player finds themselves in a brightly-lit forest, meant to provide contrast to the apartment, as I wanted it to feel like the character found some sort of peace and serenity (in comparison to the atmosphere from their "real-life"). The player-character is lulled into a sense of peace from the calming environment. It's the first level within the dream, so it's

representative of the brief reprieve that someone might find from sleeping off their problems instead of confronting them. After moving through the level, players find themselves face to face with an ancient temple and some monsters spread throughout the level. On the surface, the monsters look scary and intimidating, but the level forces the player to interact with the monsters and winds up making them draw the monster's attention to themselves. One of the most common and prevalent safety behaviors is that of not drawing attention to oneself, so this level is geared towards the perception, and the actual act, of drawing attention to themselves. I chose for the monsters to be monsters instead of people for practical development purposes, but also because I found that the representation of others as monsters is symbolic of the fear that people might develop when trying to draw the attention of real-life people.

Each of these monsters requires a specific item to be brought to them for them to fully give their attention over to the character and follow them to the end goal of the level. The items that the player brings to the monsters are a variety of pieces found within the original cyberpunk room. By utilizing these pieces instead of random objects, this exchange between character and monster becomes symbolic of an exchange of information and/or of personality. The character is physically handing over a piece of themselves to the monster, in return for their attention and willingness to follow. People with social anxiety might have trouble exchanging something personal with people that they meet, so this interaction in the game is meant to help facilitate and encourage that type of behavior. To progress through the end of the level, the character must facilitate this type of interaction with each of the monsters found throughout the level. By gaining their attention, the player directs them towards a skull that's found within the temple where the monsters will imbue their energy into it. Once the player has done so, they must bring

it to another altar which will open a door within the temple that will allow the player to head to the next level.

Upon entering the next level, the player is faced with a generic, suburban home during the night. I wanted this level to once again be a stark contrast to the previous level, so the house is bathed in darkness on the outside but is extremely lit up once inside. I broke away from the sci-fi/fantasy aesthetic with this level because where the temple level is meant to be an "escape," to practice overcoming the player's own inability to connect to others, the house level is meant to act as more of a self-reflection level for the player-character. The design and contents of the house are of a very religious household, replete with lots of Christian imagery placed around the space. I chose to incorporate this type of aesthetic into the house because I thought that the religious iconography could be relatable to people playing the game. I also chose this internal aesthetic to try and incorporate a feeling of being watched into the level by playing off the feeling of religious fear mongering and expectations. In my experience, the idea of an omniscient being watching and scrutinizing your every move is an incredibly anxiety-inducing situation. This relationship is important to the level because the level is a representation of the self-reflection stage of SAD. While the level itself gives you this feeling that you're being watched, the player is also watching themselves through self-reflection. This atmosphere acts as a reminder that one brightly lit level and experience isn't enough to solve the inner workings of anxiety, and that the journey that people experience dealing with anxiety will take many ups and downs, going to brighter and darker places within themselves.

When playing through the level, the character must navigate through the house and find a variety of different objects and areas that in turn activate a specific effect. In the original

cyberpunk apartment, one of the screens shows something known as the 5-4-3-2-1 grounding method (Smith, 2018). This method is something that is used to help people who are experiencing any type of intrusive thought to calm down and recenter and ground themselves. This method accomplishes this by having the person say five things they can see, four things they can feel, three they can hear, two they can smell, and one they can taste. I wanted to use this house level to represent this grounding method; however, within the realm of VR, the senses of taste and smell are not at a point where they can be recreated, and the ability to "feel", though it's on its way, is still not ubiquitous across all hardware and software. Therefore, I still wanted to include this coping mechanism within the game and this level but knew I would have to take out some of the senses and add more to sight and hearing as those can be manipulated at my skill level. The player moves around the house where certain objects, when interacted with, trigger a dialog box meant to represent the character's inner thoughts and reflections with their own life. After finding all of the different interactions within the level, a door that previously wouldn't open unlocks and allows the player to move onto the ending level of the game.

The player awakens in the cyberpunk apartment after going through this dream sequence in the morning after. Due to the design of the apartment, the lighting still gives off the impression that it is evening, despite the clock saying it's morning. After awakening, the player receives another message from the same friend from the night before. Instead of ignoring it, the player will be presented the opportunity to respond between a certain set of options. These will be to either accept the friend's request to see them or to ignore the message again and go back to sleep. The choice for lighting in this level is meant to symbolize how the night, or the character's anxiety, is no longer entirely consuming like the darkness of the opening level. With the slight

increase in light, it symbolizes that the dream sequence has helped alleviate the character's anxiety a little bit; however, with the presentation of the choice to respond or go back to sleep, represents that no matter how many reflections and safety behaviors you work through, everyone still has to make the choice to better themselves in the end.

In a broad overview, this game acts as a representation of social anxiety and subsequent aspects and effects that it has on people. Each level represents a different part of this cycle that people go through. The opening sequence is representative of succumbing to anxiety and withdrawing into oneself. The jungle temple showcases one of the most important safety behaviors and encourages the player to engage with and share something of themselves with something they could view as monstrous. The house level is all about personal self-reflection on the root causes of the anxiety and how it has affected you, and the last level, and ending sequence, is symbolic of all the knowledge and experience gained throughout dealing with anxiety - ending by giving the player the choice to either work towards this brighter day or to let the anxiety take over again and withdraw back into yourself. Like anxiety, this game is a cycle. In the end, the only way to break out of the cycle of anxiety is to be reflective, learn coping mechanisms, and choose to break beyond the safety behaviors.

However, while the players may be able to break out of the cycle in-game, whether or not that would carry over into the real world remains an important question. Due to a major technical issue with the most recent version of the Unreal Engine, I ended up having to completely restart this project from scratch. Because of this, I was unable to conduct any sort of user-testing to see if the ideas and themes presented in the game carry the sort of impact and meaning that I was hoping to elicit from them. From a game design perspective, user-testing is one of the most

important and informative phases of the game design process. Without this outside information, it's an incredibly difficult task to determine the strengths and weaknesses of your vision and where extra attention is needed. Despite lacking that pertinent information and perspective, I am able to provide what I took away from this entire journey.

When I first started this thesis, I was planning on doing something I was still passionate about but from a much more personally-distanced standpoint. I believed that this endeavor would be something purely academic and methodical, but as I began to actually consider what was important to me and what sort of topic I wanted to explore, I realized that the only thing that would make this thesis worthwhile would be if I did something close and intimate to own my life. As my topic became increasingly more focused on SAD, it began to feel more right to me, but also a little scary. I was apprehensive of utilizing this thesis to explore my own personal struggles with it and potentially share these struggles with others, but after beginning the research and planning out the initial design of the game levels, that worry started to fade away. I started to begin finding myself reflecting on my own struggles and attempts to work through those struggles within the levels of the game itself. The meaning of actually going through and making this vision come to life began to change me as well. Where I originally thought of this as a purely academic pursuit, began to turn a reflective and intimate piece to me. Seeing other developers' journeys in their own games sparked a sense of "I can do this too. This project can be connected to me."

This entire journey from the formation to the end of the development has revealed a plethora of things about academia, game design, and myself. This project has shown me and put me through the entire process of true academic research, formulation, and execution of the

mysteries that I want to solve. Not only have I learned an incredible number of skills and knowledge on the technical side of game design, but I also now have a newfound appreciation for developers, especially indie, for their creativity, aspiration, and determination to use this medium to explore their own personal struggles and connect with others. Most importantly, this project has shown what it feels like to truly commit myself to something and has helped me reflect and process my own history and behavior in regard to my anxiety. Pursuing and completing something of this caliber seemed like a daunting task that I feared I wouldn't have been able to do but sticking with it showed me that I had the ability to accomplish anything that I truly wanted to. The game itself is about the SAD cycle, but this entire thesis process has felt like a cycle in and of itself. A cycle that I was able to complete and break free from so to speak. By doing something like that, I realized that the same cycle that I go through with my own anxiety is something that I can complete and break free from as well.

Whenever I started this thesis, I thought that the game was going to be for anyone who wanted to play it, but more specifically, being interested in the application of social anxiety through the medium of games; however, I now realize there is a much larger, more selfish aspect to it. By the end, this project has almost become entirely *for* me. Even if no one ever played the game itself, the journey that this thesis has made me go on has given me information, skills, and confidence that will carry over into every other aspect of my life.

Bibliography

Actual Sunlight. PC, 2014. WZOGI, Developer & Publisher.

Andrade, L. H., et al. "Barriers to Mental Health Treatment: Results from the WHO World

Mental Health Surveys." *Psychological Medicine*, vol. 44, no. 6, 2013, pp. 1303–1317.,https://doi.org/10.1017/s0033291713001943.

Báldy, Imre Dániel, et al. "An Engaging Serious Game Aiming at Awareness of Therapy Skills Associated with Social Anxiety Disorder." *Mobile Networks and Applications*, 9 Mar. 2021, doi:10.1007/s11036-021-01743-3.

Beidel, Deborah C., et al. "Treating Childhood Social Anxiety Disorder with Virtual Environments and Serious Games: A Randomized Trial." *Behavior Therapy*, 18 Mar. 2021, doi:10.1016/j.beth.2021.03.003.

"Beyond Blue." *Anxiety, Depression, and Suicide Prevention Support*, https://www.beyondblue.org.au/.

Bogost, I. *Persuasive Games: The Expressive Power of Videogames*. The MIT Press. (2010).

Boyle, Elizabeth A., et al. "An Update to the Systematic Literature Review of Empirical Evidence of the Impacts and Outcomes of Computer Games and Serious Games." *Computers & Education*, vol. 94, 1 Mar. 2016, pp. 178–192., https://doi.org/10.1016/j.compedu.2015.11.003.

Brijnath, Bianca, et al. "Do Web-Based Mental Health Literacy Interventions Improve Mental Health Literacy of Adult Consumers? Results from a Systematic Review." *Journal of* the*Medical Internet Research*, vol. 18, no. 6, 20 June 2016, https://doi.org/10.2196/jmir.5463.

Brom, Cyril, et al. "Flow, Social Interaction Anxiety and Salivary Cortisol Responses in Serious Games: A Quasi-Experimental Study." *Computers & Education*, vol. 79, 2014, pp. 69–100., https://doi.org/10.1016/j.compedu.2014.07.001.

Coming Out Simulator. Web-browser, 2014. Nicky Case, developer.

Cheong, Yun-Gyung, et al. "A Computational Approach Towards Conflict Resolution for Serious Games." *Proceedings of the 6th International Conference on Foundations of Digital Games - FDG '11*, 29 June 2011, https://doi.org/10.1145/2159365.2159368.

Clark, D. M., and A. Wells. "A Cognitive Model of Social Phobia." *Social Phobia: Diagnosis, Assessment, and Treatment*, Guilford Press, New York, NY, 1995, pp. 69–93.

David, Oana Alexandra, et al. "How Effective Are Serious Games for Promoting Mental Health and Health Behavioral Change in Children and Adolescents? A Systematic Review and Meta-Analysis." *Child & Youth Care Forum*, vol. 49, no. 6, 2020, pp. 817–838., doi:10.1007/s10566-020-09566-1.

Depression Quest. PC, 2013. The Quinnspiracy, Developer & Publisher.

Dyer-Witheford, Nick, and Greig De Peuter. *Games of Empire Global Capitalism and Video Games*. University of Minnesota Press, 2009.

Fisher, I. J. *Video Games and International Development: A Case Study of the Half the Sky Movement* [Doctoral Dissertation]. University of Oregon. (2016).

Fitzgerald, Martin, and Gemma Ratcliffe. "Serious Games, Gamification, and Serious Mental Illness: A Scoping Review." *Psychiatric Services*, vol. 71, no. 2, 1 Feb. 2020, pp. 170–183., https://doi.org/10.1176/appi.ps.201800567.

Flanagan, M., & Nissenbaum, H.. *Values at Play in Digital Games*. The MIT Press. (2016).

Fleming, Theresa M., et al. "Serious Games and Gamification for Mental Health: Current Status and Promising Directions." *Frontiers in Psychiatry*, vol. 7, 10 Jan. 2017, https://doi.org/10.3389/fpsyt.2016.00215.

Florence. PC, 2018. Mountains, Developer, Annapurna Interactive, Publisher.

Fox, Annie B., et al. "How and When Does Mental Illness Stigma Impact Treatment Seeking? Longitudinal Examination of Relationships Between Anticipated and Internalized Stigma, Symptom Severity, and Mental Health Service Use." *Psychiatry Research*, vol. 268, 19 June 2018, pp. 15–20., https://doi.org/10.1016/j.psychres.2018.06.036.

HealthPartners. "Stigma of Mental Illnesses Decreasing, Survey Shows." *HealthPartners*, 24 Feb. 2020, https://www.healthpartners.com/hp/about/press-releases/stigma-of-mental-illnesses-decreasing.html

Heimberg, R. G., et al. "A Cognitive-Behavioral Model of Social Anxiety Disorder." *Social Anxiety: Clinical, Developmental, and Social Perspectives*, 3rd ed., Elsevier/AP, Amsterdam, 2014, pp. 705–728.

Hookham, Geoffrey, et al. "A Concurrent Think Aloud Study of Engagement and Usability in a Serious Game." *Serious Games*, 3 Sept. 2016, pp. 214–219., https://doi.org/10.1007/978-3-319-45841-0_20.

Jorm, Anthony F, et al. "'Mental Health Literacy': A Survey of the Public's Ability to Recognise Mental Disorders and Their Beliefs about the Effectiveness of Treatment." *Medical Journal of Australia*, vol. 166, no. 4, 17 Feb. 1997, pp. 182–186., https://doi.org/10.5694/j.1326-5377.1997.tb140071.x. \

Jorm, A. F. "Mental Health Literacy: Public Knowledge and Beliefs about Mental Disorders." *British Journal of Psychiatry*, vol. 177, no. 5, Nov. 2000, pp. 396–401., https://doi.org/10.1192/bjp.177.5.396.

Kim, Hyun-Jin, et al. "Effectiveness of a Participatory and Interactive Virtual Reality Intervention in Patients with Social Anxiety Disorder: Longitudinal Questionnaire Study." *Journal of Medical Internet Research*, vol. 22, no. 10, 2020, doi:10.2196/23024.

Kuosmanen, T., et al. "A Pilot Evaluation of the Sparx-R Gaming Intervention for Preventing Depression and Improving Wellbeing Among Adolescents in Alternative Education." *Internet Interventions*, vol. 8, 29 Mar. 2017, pp. 40–47., https://doi.org/10.1016/j.invent.2017.03.004.

Laamarti, F., Eid, M., & El Saddik, A. (2014). An Overview of Serious Games. *International Journal of Computer Games Technology*, *2014*, 1–15. https://doi.org/10.1155/2014/358152

Marsh, Tim. "Serious Games Continuum: Between Games for Purpose and Experiential Environments for Purpose." *Entertainment Computing*, vol. 2, no. 2, 1 Jan. 2011, pp. 61–68., https://doi.org/10.1016/j.entcom.2010.12.004.

Mechanic, David. "Removing Barriers to Care Among Persons with Psychiatric Symptoms." *Health Affairs*, vol. 21, no. 3, May 2002, pp. 137–147., https://doi.org/10.1377/hlthaff.21.3.137.

Merry, S. N., et al. "The Effectiveness of Sparx, a Computerised Self Help Intervention for Adolescents Seeking Help for Depression: Randomised Controlled Non-Inferiority Trial." *BMJ*, vol. 344, no. apr18 3, 19 Apr. 2012, https://doi.org/10.1136/bmj.e2598.

Michael, David, and Sande Chen. *Serious Games: Games That Educate, Train, and Inform*, Course Technology, Mason, OH, 2011, p. 17.

"Moodgym CBT Training Program." *Moodgym*, https://moodgym.com.au/.

Morgan, Hugh, and Catriona Raffle. "Does Reducing Safety Behaviours Improve Treatment Response in Patients with Social Phobia?" *Australian & New Zealand Journal of Psychiatry*, vol. 33, no. 4, Aug. 1999, pp. 503–510., https://doi.org/10.1080/j.1440-1614.1999.00599.x.

Neary, Martha, and Stephen M. Schueller. "State of the Field of Mental Health Apps." *Cognitive and Behavioral Practice*, vol. 25, no. 4, 1 Nov. 2018, pp. 531–537., https://doi.org/10.1016/j.cbpra.2018.01.002.

Purdon, Christine, et al. "Social Anxiety in College Students." *Journal of Anxiety Disorders*, vol. 15, no. 3, May 2001, pp. 203–215., https://doi.org/10.1016/s0887-6185(01)00059-7.

Qian, Meihua, and Karen R. Clark. "Game-Based Learning and 21st Century Skills: A Review of

Recent Research." *Computers in Human Behavior*, vol. 63, 1 Oct. 2016, pp. 50–58., https://doi.org/10.1016/j.chb.2016.05.023.

Qu, Chengcheng, et al. "Functionality of Top-Rated Mobile Apps for Depression: Systematic Search and Evaluation." *JMIR Mental Health*, vol. 7, no. 1, 24 Jan. 2020, https://doi.org/10.2196/15321.

Ravaja, Niklas. "Contributions of Psychophysiology to Media Research: Review and Recommendations." *Media Psychology*, vol. 6, no. 2, 1 May 2004, pp. 193–235., https://doi.org/10.1207/s1532785xmep0602_4.

Ritterfeld, Ute, et al. *Serious Games: Mechanisms and Effects*. Routledge, 2009.

Salkovskis, Paul M. "The Importance of Behaviour in the Maintenance of Anxiety and Panic: A Cognitive Account." *Behavioural Psychotherapy*, vol. 19, no. 1, Jan. 1991, pp. 6–19., https://doi.org/10.1017/s0141347300011472.

Schmidt, Norman B., et al. "Randomized Controlled Trial of False Safety Behavior Elimination Therapy: A Unified Cognitive Behavioral Treatment for Anxiety Psychopathology." *Behavior Therapy*, vol. 43, no. 3, 1 Sept. 2012, pp. 518–532., https://doi.org/10.1016/j.beth.2012.02.004.

Schneider, Justine, et al. "Acceptability of Online Self-Help to People with Depression: Users' Views of Moodgym Versus Informational Websites." *Journal of Medical Internet Research*, vol. 16, no. 3, 28 Mar. 2014, https://doi.org/10.2196/jmir.2871.

Smith, Sarah. "5-4-3-2-1 Coping Technique for Anxiety." *BHP Blog - Behavioral Health Partners (BHP) - University of Rochester Medical Center*, 10 Apr. 2018, https://www.urmc.rochester.edu/behavioral-health-partners/bhp-blog/april-2018/5-4-3-2-1-coping-technique-for-anxiety.aspx.

"Sparx." *Sparx.org.nz*, University of Auckland, https://www.sparx.org.nz/.

Stangier, Ulrich, et al. "Safety Behaviors and Social Performance in Patients with Generalized Social Phobia." *Journal of Cognitive Psychotherapy*, vol. 20, no. 1, Mar. 2006, pp. 17–31., https://doi.org/10.1891/jcop.20.1.17.

The Suicide of Rachel Foster. PC, 2020. Daedalic Entertainment, Developer & Publisher.

Twomey, Conal, et al. "A Randomized Controlled Trial of the Computerized CBT Programme, Moodgym, for Public Mental Health Service Users Waiting for Interventions." *British Journal of Clinical Psychology*, vol. 53, no. 4, 15 May 2014, pp. 433–450., https://doi.org/10.1111/bjc.12055.

"Understand the Facts: Anxiety and Depression Association of America, ADAA." *Anxiety*

Disorders and Depression Research & Treatment, https://adaa.org/understanding-anxiety.

Wells, Adrian. *Cognitive Therapy of Anxiety Disorders: A Practice Manual and Conceptual Guide*. Wiley-Blackwell, 1997.

Wu, Jinlong, et al. "Virtual Reality-Assisted Cognitive Behavioral Therapy for Anxiety Disorders: A Systematic Review and Meta-Analysis." *Frontiers in Psychiatry*, vol. 12, 23 July 2021, doi:10.3389/fpsyt.2021.575094.