Breaking the Stigma: Major Depressive Disorder

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Breaking the Stigma: Major Depressive Disorder

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ABSTRACT

Major Depressive Disorder (MDD) is a mood and mental disorder affecting the brain; it is caused by the reduction of three monoamine neurotransmitters: serotonin, norepinephrine, and dopamine (Rot, M. A., Mathew, S. J., & Charney, D. S. 2009). MDD is one of the world’s most common mental disorders, affecting a predicted 4% of the world’s population and roughly 16.1 million adults in United States alone (Major Depression. 2019; Ritchie, H., & Roser, M. 2018). The concentrations of these neurotransmitters are reduced in the brains of people with MDD due to their increased reabsorption from synapses in the brain back into presynaptic neurons (Ruhé, H. G., Mason, N. S., & Schene, A. H. 2007). In attempt to regulate the concentrations of these neurotransmitters in people with MDD, medications like SSRIs, SNRIs, TCAs, and MAOIs can be prescribed (Yeragani, V., Ramachandraih, C., Subramanyam, N., Bar, K., & Baker, G. 2011). In addition to neurochemical changes, neuroanatomical changes have also been reported in people with MDD (Treadway, M. T., & Pizzagalli, D. A. 2014).

In recent years, depressive disorders have captured brief media attention due to celebrities sharing their experiences with MDD, as well as celebrities dying by suicide. Although depressive disorders are more frequently being acknowledged and discussed in a public spotlight, there remains a stigma surrounding mental illness including MDD. This partially stems from a lack of public understanding that mental disorders are, indeed, illnesses. Societal pressures may prevent people suffering from mental illnesses from accepting that they have a disorder, seeking help from medical professionals, and not being ashamed of their disorder (Corrigan, P. W., Druss, B. G., & Perlick, D. A. 2014). Furthermore, individuals that have sought help often talk to a physician or psychiatrist about their diagnosis, but they may struggle to understand the information presented to them. The purpose of this project was to create several illustrations and an animation that would strengthen public and patient education and understanding of MDD in attempt to help break some of the stigma that surrounds this mental illness.
INTRODUCTION

In recent years, the conversations about mental health and mental illness have slowly been gaining attention, in part through media coverage of celebrities’ struggles and suicides. While mental health is increasingly being discussed within the public community, there remains a stigma surrounding mental disorders which is derived from a lack of public education and understanding of them. Major depressive disorder (MDD) is just one of the mental disorders impacting people globally, and while mental disorders are medically accepted as illnesses, members of the public still struggle to acknowledge the validity of a diagnosis. Due to social pressures, people who suffer from MDD, or other mental illnesses, may be influenced to deny their disorder and feel ashamed of it, and this could prevent them from seeking necessary help from mental health professionals (Corrigan, P. W., Druss, B. G., & Perlick, D. A. 2014).

The importance of this project stems from the need for increased understanding of mental illness, and specifically to raise public awareness and education of major depression. In addition to this primary goal, the work created would provide a bridge between medical professionals and their patients by providing visual tools to help describe MDD to patients, rather than relying merely on verbal communication.

The intended primary audience for this body of work is the public. The secondary audience includes people who have MDD but have not sought medical assistance, patients, and their loved ones. The tertiary audience involves medical professionals, mental health professionals, and community mental health agencies who would view the work with members of the primary or secondary audiences when helping them learn about and understand MDD. The posters created were designed as public service announcements to express what living with MDD can be like and to provide side-by-side views of neuroanatomical differences between a brain with MDD and one without the disorder. The animation teaches the audience what MDD is, its symptoms, the three neurotransmitters involved in the disorder, medications, and other possible treatments that would assist with symptom management. In viewing the illustrations and animation, the audience would gain an understanding of what MDD is as well as some of the structural and chemical differences associated with the disorder.

To successfully create the work for this project, Dr. Meghan Fox (Dr. Fox), a clinical psychologist in Rochester, was consulted regularly throughout the creative process, and she provided expertise and feedback on the scientific content and accessibility of the artwork. Dr.
Fox also facilitated a collaboration with the Rochester chapter of the National Alliance on Mental Illness (NAMI). With NAMI, focus groups were formed to gather feedback on the work created from individuals in the target audience.
Breaking the Stigma: Major Depressive Disorder

SCIENTIFIC BACKGROUND

WHAT IS MAJOR DEPRESSIVE DISORDER?

Major Depressive Disorder (MDD) is a mood disorder that causes changes to one’s personality and temperament. MDD is one of the world’s most common mental disorders with an estimated 4% of the global population suffering from it; additionally, approximately 16.1 million adults in United States are affected by this disorder (Ritchie, H., & Roser, M. 2018). Symptoms of MDD will vary depending on the individual, but several possible symptoms include persistent sadness; feelings of negativity; losing interest in hobbies or daily activities; changes in appetite or weight; changes in sleep patterns; or having thoughts about suicide or death (Major Depression. 2019; Ritchie, H., & Roser, M. 2018).

MDD is caused by a reduction of three neurotransmitter concentrations in the brain: serotonin, norepinephrine, and dopamine (Rot, M. A., Mathew, S. J., & Charney, D. S. 2009). Neurons, cells of the nervous system, communicate with one another via neurotransmitters, so when concentrations are reduced, communication between these cells will change. This altered communication within the brain can result in behavioral or mood changes, as seen with MDD (Harvard Health Publishing. 2009). The cycles of these three neurotransmitters originate in specific areas of the brain stem, and each neurotransmitter has unique functions within the brain. Serotonin is released from neurons in the medulla; this neurotransmitter is involved in the regulation of appetite, digestion, sleep-wake cycles, mood, memory, and sexual desire (Harvard Health Publishing. 2009; Charnay, Y., & Leger, L. 2010). Norepinephrine is released from the pons and is responsible for attention focusing, the body’s flight-or-fight response, memory, and arousal (Harvard Health Publishing. 2009; Tully, K., & Bolshakov, V. Y. 2010). Dopamine is released from the midbrain and is involved in reinforcement, reward, pleasure, motivation, and fine motor functions (Harvard Health Publishing. 2009; Luo, S. X., & Huang, E. J. 2016).

As these neurotransmitters are released from presynaptic neurons, norepinephrine and serotonin will bind to norepinephrine and serotonin receptors, respectively, on the pre and postsynaptic neurons, while dopamine only binds to dopamine receptors on postsynaptic neurons. Once bound to their corresponding receptors, any of these neurotransmitters remaining within the synapses will be reabsorbed into a presynaptic neuron by their corresponding transporters. Serotonin is reabsorbed by serotonin transporters (SERTs), norepinephrine by
norepinephrine transporters (NETs), and dopamine by dopamine transporters (DATs). Following their reabsorption, these neurotransmitters are broken down by monoamine oxidase (MAO), and their components will be recycled within the neuron (Maiese, K. 2019).

The concentrations of these three neurotransmitters are reduced in the brains of people with MDD, in part because of their increased reabsorption into presynaptic neurons by their corresponding transporters, and partly due to their destruction by MAO once reabsorbed (Harvard Health Publishing. 2009). In attempt to regulate neurotransmitter concentrations in people with MDD, medications like serotonin reuptake inhibitors (SSRIs), serotonin norepinephrine reuptake inhibitors (SNRIs), tricyclic antidepressants (TCAs), or monoamine oxidase inhibitors (MAOIs) can be prescribed. SSRIs, SNRIs, and TCAs all bind to the transporters on presynaptic neurons. In doing so, reuptake of serotonin, norepinephrine, and dopamine is inhibited, thus an increase will occur in their availability within the brain’s synapses. MAOIs bind to MAOs and prevent the breakdown of these neurotransmitters once reabsorbed into the presynaptic neuron. This medication is typically prescribed once the others have been unsuccessful because of their dramatic side effects (Yeragani, V., Ramachandrai, C., Subramanyam, N., Bar, K., & Baker, G. 2011).

In addition to the neurochemical changes, neuroanatomical changes have also been reported in people with MDD. These structural changes may include the increased activity of the amygdala, a volume reduction of the hippocampus, a volume reduction of the medial prefrontal cortex gray matter, and an enlargement of the lateral ventricles (Treadway, M. T., & Pizzagalli, D. A. 2014; Rot, M. A., Mathew, S. J., & Charney, D. S. 2009).
THE BODY OF WORK

OVERVIEW

This project involved the creation of a 2D animation that described MDD and demonstrated the changes in the release and reabsorption of the three neurotransmitters involved in the pathogenesis of this disorder. Additionally, a series of posters was created to illustrate what MDD can feel like and to show some of the neuroanatomical changes associated with MDD.

The goal behind the work created was to provide visual aids describing MDD for a broad audience. Few visual resources currently exist for the public or in clinical settings that describe what neurochemical and anatomical changes occur in MDD. Public education of this disorder is minimal, and patients are normally provided with information on their diagnosis verbally, or they are given pamphlets filled primarily with text. The work created for this project can provide engaging teaching tools for not only for the public, but also for patients, and patients’ loved ones.

GOALS OF THE ARTWORK

1. Create – 2D illustrations and a 2D animation describing the characteristics of MDD.
2. Demonstrate – illustrate comparisons of the neuroanatomical changes and animate the chemical changes that can occur with MDD.
3. Teach – effectively inform the public and patients about why and how this disorder occurs.
ILLUSTRATION PROCESS

Posters

Three posters were created to act as both educational posters and public service announcements for MDD (see figures 5-7 in images section). The goals of their creation were to capture what it can be like living with MDD and several of the brain changes that occur with the development of this disorder. Because of this disorder’s broad range of symptoms, three overarching themes were decided upon: sadness/hopelessness, irritability/frustration, and neutrality.

It was important during the creation process to ensure that these posters were authentic, so all three of the portraits drawn were of people who have suffered from or are currently experiencing major depression. Prior to drawing them, each model was asked if they were willing to participate in this project and were given a description of the themes and goal of the posters; it was imperative that they were all completely comfortable with being on a poster that would display their disorder publicly. The three people who participated were asked to model for reference photos, and during the shoot they expressed the range of feelings they have experienced with their depression. Directly following the photo session, they were all asked to view the photos taken and choose several that were most representative of their experience with MDD. From the photographs that the three models chose, one photograph was selected to create their portrait.

The posters were all created in a similar fashion. A graphite drawing was created of a model who has experienced major depression. The portraits were scanned and opened in Adobe Photoshop where they were combined with background photographs. Following this, the portraits were colorized based on the theme for which it was created: sadness-blue, irritability-red, neutrality-grayish purple. The portrait files were then brought into Adobe Illustrator where the illustrations and descriptions of the neurotransmitter and neuroanatomical changes were formatted.

The brain illustrations were all created in Adobe Illustrator; two illustration sets highlighted structural changes that can occur in the brain of someone with MDD: lateral ventricle enlargement, amygdala enlargement, and hippocampus volume reduction; and one illustration focused on the neurotransmitters involved in this disorder and the regions from which they are
released. The goal of these illustrations was to supplement the portraits and emphasize that MDD is a result of changes that occur in the brain. The brain illustrations showing the structural differences were placed on the posters with the more apparent and visible emotions. Additionally, the amygdala and hippocampus illustration was included on the irritability poster because an increased amygdala size is related to increased anger, frustration, and irritability. The lateral ventricle illustration was placed on the sadness poster for the reasoning previously explained. The neurotransmitter illustration was placed on the neutrality poster because these changes cannot be seen and the emotion captured by this portrait was not intended to be clear.

Upon the completion of the layout, text was added to each poster; the type face used, apart from the title, was Helvetica to ensure legibility. Each set of brain illustrations had a corresponding description, and this was placed to the left of or slightly above the illustrations to ensure that the viewer would see this information, and then view the illustrations to understand the possible changes in the brain. On each poster, a list of common symptoms was included, and each list paralleled to the poster’s theme. The titles were added last; the thin type-face chosen – Avenir Next Ultra Light – was purposeful because the envisioned emphasis was on the portrait and brain illustrations, and a bolder typeface would have distracted from the artwork.
ANIMATION PROCESS

The animation was chosen to be created in 2D. For the purposes of this project, the theatrics and complexity of a 3D animation were not required; rather a simple, 2D animation would allow for concepts to be illustrated and described clearly which was important for an intended audience of the public and patients.

Script

To begin the animation process, a script was developed. This step was completed first because it would solidify the topics addressed throughout the animation. In writing the first draft of the script, it was decided that this animation would introduce what MDD is, how it can be diagnosed, common symptoms, the chemical changes that occur in the brain of someone with MDD, and some of the ways to manage symptoms. While writing the first draft, the average reading level of a lay audience was not considered. Upon completing a first draft, the text was shared with Dr. Fox for content accuracy. After receiving her feedback, it was decided that accessibility should be prioritized because a public audience member may not have a broad education within the sciences, so the scientific jargon used in the initial draft would not be widely accessible. To determine the readability of the script, the Flesch-Kincaid Grade Level test in Microsoft Word was used. The first draft of the script had a reading level of 15, so the script was edited to increase accessibility. During the editing process, the goal was to bring the reading level down to an 8th grade level because most adults in the US have at least a middle school education. To accomplish this, the scientific terminology and more complex vocabulary needed to be replaced with language that would be more accessible to the public: e.g. ‘released via exocytosis’ was changed to ‘released’ when discussing neurotransmitter release into synapses. Additionally, explanations of certain scientific terms were added: e.g. defined and explained what neurons and neurotransmitters are. Because of the detail of scientific content covered, reducing the reading level was difficult to accomplish, and ultimately, a 10th grade reading level was achieved. The script went through four rounds of revisions, with the help of Dr. Fox, before a final script was approved. The second draft of the script was used to begin the storyboarding process, but additional edits were made to the script during storyboard production. Upon
completion of the script, it was recorded and a final storyboard was created to outline the flow and visuals of the animation.

**Storyboard**

To develop the storyboard, the second draft of the script was referenced to produce illustrations in Adobe Photoshop and Illustrator. The images created were arranged in Microsoft PowerPoint, and in addition to a still image, each slide contained two boxes of text: one with the corresponding narration and one with an image description, see Figure 1. Once the initial storyboard was created, it was shared with Dr. Fox, so she could provide feedback on content accuracy, image flow, and visual appeal. Dr. Fox made several suggestions for the first storyboard: begin animation by defining MDD, add incidence of MDD in the United States, reorganize board so basic information was introduced before neurochemical changes, among other recommendations. To accommodate these changes and additions, script revisions were necessary. Once the script was updated, the corresponding alterations were made to the storyboard. The second draft of the storyboard was approved, so the animation process could begin.

Figure 1. Example of a storyboard slide in Microsoft PowerPoint.
Narration

The script was recorded and edited in Adobe Audition. These recordings were completed prior to animating, so the timing of the animation would be consistent with the narration. The narration was recorded in seven sections, so there would be more control over timing during the animation process. While editing, all audio files were normalized and denoised. Additional audio was recorded following the focus groups, so that suggested content could be added to the animation.

Development of Assets

The assets, seen in Figures 2-4, required for the animation were all created in Adobe Illustrator. This program was used because the animation style was 2D, and the vector images produced would be high quality when placed into a composition in Adobe After Effects. Each individual illustration was placed on a separate layer; this was done to ensure that all objects could be added and edited individually in Adobe After Effects.

The colors chosen for the assets were vibrant to maintain the visual interest of viewers; duller, less saturated graphics would not have captured the attention of viewers as well. The brains were colored pink to mimic tissue color; the neurons were illustrated as multipolar because this is the cell-type found within the central nervous system, and they were colored a pink-purple to maintain an association with the brain and to mimic staining properties. The medical professionals and people were designed with simple bodies and were kept sexless and faceless to prevent a viewer from associating the disorder or credible medical professionals with a specific sex. Additionally, the people were colored with blues, pinks, purples, and yellows to prevent any race or ethnicity associations. The medical professionals had defining characteristics to differentiate them from one another: prescription pad for the psychiatrist, notebook for the psychologist, brain for the neurologist, and patients for the family doctor.

The gears were created to demonstrate the brain functioning in the animation. To illustrate the United States and the three globe views, Google Earth used as reference to maintain geographic and topographic integrity.

Within the synapse, the receptors, transporters, neurotransmitters, and drugs were
illustrated as simple shapes because the release, reabsorption, and binding processes needed to be as clear to the audience as possible. Scientific integrity was maintained through the positioning and interaction of all the elements within the synapse. The use of the surface structure of the receptors and transporters was considered, but having the more complex structures would have possibly hindered a viewer’s ability to grasp the general concepts, or the viewers would not have picked up on the fact that they were the surface structures, so basic shapes were used.

To illustrate the three neurotransmitters and the four groups of medications, 3D structures of the molecules were first found on and downloaded from PubChem. The .sdf file of each molecule was brought into Chimera to fill in missing hydrogens. Additionally, the molecules were oriented, so all elements composing the molecules could be seen. These models were then saved, and the images were used as reference to create vector illustrations of the molecules. Different colors were chosen for the surface structures of each molecule, so audience members could easily distinguish them from one another; the colors of the neurotransmitters were kept consistent with the regions of the brain from which they are released, so viewers would maintain a connection between the brain regions and neurotransmitters.

The ball-and-stick models of the molecules were included in addition to the surface structures because of the range of education levels accompanying a public audience. To prevent the ball-and-stick models from being the focus of the molecules, the surface structures were made slightly transparent and were placed over the ball-and-stick structures. The surface models would provide something tangible for viewers to associate the neurotransmitters and drugs with, and the ball-and-stick models provided molecular structures for those with scientific backgrounds. Additionally, if someone had a broader scientific background, including the ball-and-stick models would show the similarities between the neurotransmitters and medications which would help emphasize the drug functions.

Once the assets were complete, they were imported into Adobe After Effects and were used to compose the animation.
Figure 2. Assets page including the three views of the globe, the USA, the generic people, a neuron, and the synapse elements: vesicle, receptors, transporters, MAO, neurotransmitter (green), and two drugs (yellow and pink).

Figure 3. Assets page with the prescription pad, medical professionals, and ‘healthy’ people.
Figure 4. Assets page showing the two brains, the neurotransmitters, the drugs, brain regions, and body outline.

**Animation**

Once all assets were created, Adobe After Effects was used to compose the animation. When composing the animation, it was divided into seven different pre-compositions: Intro, Part 1, Part 2, Part 3, Part 4, Part 5, and Part 6. The purpose of creating the precompositions was to prevent the workspace from becoming overwhelmed with layers. In breaking each section into its own precomposition, the workspace would be better organized, thus making it easier to manage. The timing of each of these sections was based on the corresponding narration file. All assets from Illustrator were imported into After Effects as compositions, so that the layers would be retained. This allowed for each individual illustration to remain separate from all the others in the same file, allowing them to be acted upon and animated individually.

The introduction section outlined the topics that would be covered in the animation, so viewers would gather an idea of what they would learn throughout the animation. Part 1 defined MDD, the general effects of the disorder, the incidence in the United States, and who can
diagnose this disorder. It was important to introduce these facts at the beginning of the animation, so viewers could understand who this disorder affects, how it can impact an individual, and who can help. Once this information was provided, part 2 then covered some of the symptoms associated with MDD. This section did not include all the possible symptoms because there are many; however, it provided the audience with a general overview of some of the most common symptoms one might experience with MDD. Part 3 went on to discuss what a neurotransmitter is, what a neuron is, how neurons communicate via neurotransmitters, the three specific neurotransmitters involved in MDD, and the roles of these neurotransmitters in the brain. This section provided a base knowledge that viewers could apply later in the animation. It was important that viewers be familiar with the cells, how communication occurs within the central nervous system (CNS), and what neurotransmitters are involved in MDD to understand the changes that occur with MDD and how those changes alter brain function. Between parts 3 and 4, there is a summary section for viewers to recall what had been covered in the animation to that point. In creating this break in the material, the goal was to provide viewers a chance to reflect upon and comprehend the material that was presented to them. In part 4, viewers would be able to apply the information covered in the first half of the animation, as the specifics of the neurochemical changes associated with MDD were explained by comparing a synapse in a brain without MDD and one with the disorder. Additionally, the effects of low concentrations of these neurotransmitters were individually outlined. Part 5 introduced the four types of drugs that can be prescribed to assist with symptom management. To show the significance of these drugs, part 6 demonstrates how these medications work at the synapses. Additionally, this last section outlined other methods of symptom management and several mental health resources.

When animating the synapses with and without MDD, it was contemplated as to whether the transmission, reabsorption, and break down processes should be individually shown for each of the three neurotransmitters using their respective structures, i.e. use surfaces of serotonin, serotonin receptors, and SERTs, and then doing this for norepinephrine and dopamine. However, if this had been done, it would not have been an efficient way of showing how these processes occur and would have ultimately been showing the same process three times. Because the release, reabsorption, and breakdown of all three neurotransmitters are almost identical, these three processes were only animated once, and any discrepancies were defined in supplementary text during the animation. Additionally, because SSRIs, SNRIs, and TCAs function in a similar
manner, the function of these drugs was also animated once, and then the function of MAOIs was shown separately because of its distinctiveness.

Throughout the animation several regular creative decisions were made to maintain visual interest. The opacity feature was utilized often when introducing or removing objects from the screen, and in the cases of lists of text, when fading off screen, a blur filter was placed on the text objects to create a more appealing fade. In sections where there was a large list of text, the text was introduced gradually to guide viewers as they read through the text. If a large list of text had popped up at once, this might have been overwhelming to viewers, and they might have skimmed the material rather than reading it fully. Additionally, text was gradually faded out to give viewers extra time to read text that appeared on screen last. Another creative decision made was to give subtle rotation or movement to objects that would have otherwise been static, e.g. neurotransmitter and drug structures. This was done to maintain a viewer’s visual interest. Furthermore, with any scale changes or sliding motions that occurred, an easy ease setting was applied to the keyframes to create smooth transitions at the beginning and end of the motions.

Upon completion of the animation, it was exported into Adobe Media Encoder where it was compressed into an .mp4 file.

**Measurement of Success**

This project’s aim progress was measured through focus groups. These groups were important because they provided an opportunity to receive feedback from members of this project’s intended audience: people in the mental health and public communities. With the help of Dr. Fox and NAMI Rochester, focus groups were formed and meeting times were scheduled. These groups viewed the animation created for this project, and they provided feedback on the visual engagement of the work, the pacing of the animation, and their understanding of the topic covered. Both meetings were held at NAMI Rochester headquarters.

The first meeting was held on March 25, 2019, and the group was made up of community members, loved ones, and peers of people with mental illnesses. This group was incredibly supportive of this project and provided great feedback. Some of their comments included:

- Add mental health resources at end of the animation
The second meeting was held on March 28, 2019 during the Underserved Population Committee meeting. This group involved members of the deaf and hard of hearing community; and some of their feedback included:

- The visuals are beautiful
- At the beginning the pace felt a little slower and drawn out
- Seemed like the words might've been vibrating or moving at one point
- Use contrasting fonts if you can, like bold
- Add captioning if you can
- Still need to simplify the language further

After holding these two groups and reviewing the feedback provided, several edits were made to the animation: additional audio was recorded and assets were created to include other methods of symptom management. Ambient music was created for the whole animation. The text was edited, so that it varied more in size and boldness, creating more of a visual hierarchy. In the section discussing the types of medication, the generic drug names were added below the name-brands. To ensure that none of the text was moving or vibrating, all text objects were checked for any extra and unnecessary keyframes controlling scale, position, or rotation.

Music

Ambient music was created and recorded with GarageBand. Prior to using GarageBand,
several royalty free music sites were explored. However, it was difficult to find royalty free music that would span the entire animation and would fit the mood of the animation.

Within GarageBand, there were several instrument types to pick from, and each had an existing set of chords that could be combined to create a unique piece of music. For this animation, a mellow, acoustic instrument would best fit the mood, so the acoustic guitar was selected and used to produce a piece of music. Three and a half minutes of music was created in GarageBand, and then it was exported into Adobe Audition, where it was duplicated to make it span the full length of the animation. Additionally, a fade in was added onto the beginning and a fade out was added to the end of the music, so there were smooth transitions at the start and end of the music.
CONCLUSION

Being informed about mental health and mental illness has become increasingly important as celebrities, our peers, family members, and friends have more readily shared their experiences. In being informed and becoming an ally for those who suffer from mental illnesses, the stigma surrounding mental illness will diminish, and hopefully, vanish in the future. To help facilitate the destruction of this stigma, this project focused on one mental illness: MDD.

The objectives of this project were to create engaging visuals that would help increase public and patient education of MDD. Both components of this project provided clear, engaging, and informative visuals for audience members to learn about and understand this mental disorder. From the posters, viewers would gather a sense of how living with MDD might feel, become familiar with some of the symptoms involved, and learn about a few of the described neuroanatomical changes. The animation would teach viewers not only about what this disorder is, who it affects, and several possible symptoms, but it also would teach them the specifics of the chemical processes that occur in the brain and how they change when someone has MDD. Additionally, it would provide viewers with an understanding of how the current medications for MDD work in attempt to help patients manage symptoms. Altogether, the animation and posters provide tangible and vibrant visuals for audience members to understand MDD and learn that it is truly an illness. The focus groups solidified the effectiveness of the animation, and reaffirmed that although there was quite a bit a scientific content, it would successfully reach, engage, and teach the intended audience.

This project was also incredibly rewarding personally. In addition to learning and successfully utilizing After Effects, Audition, Illustrator, along with the other programs used, it provided a profound opportunity to learn about the mental health community, their welcoming nature, and their diligent efforts to raise awareness and educate people on mental illness and the importance of mental health. It was humbling and gratifying to have the opportunity to work with people within the mental health community to create the best possible tool for the education of MDD.
IMAGES

Figure 5. Poster 1: Sadness

Brain Ventricles
A. Lateral Ventricle
B. Third Ventricle
C. Fourth Ventricle

The lateral ventricles of the brain may become enlarged in people with MDD.

Common Symptoms of Major Depression:
- Persistent sadness
- Feeling worthless
- Feeling helpless
- Feeling empty
Living with depression
You Are Not Alone

Common Symptoms of Major Depression:
Less interest in hobbies
Having less energy
Feeling numb
Feeling tired

The three neurotransmitters involved in MDD are dopamine, norepinephrine, and serotonin. They are all released from areas in the brain stem and play important roles in managing our mood and behavior.

Figure 6. Poster 2: Neutrality/Numbness
Breaking the Stigma: Major Depressive Disorder

Living with depression
You Are Not Alone

Common Symptoms of Major Depression:
Feeling pessimistic
Feeling restless
Feeling angry
Irritability

Two of the structural changes that can occur with MDD impact the amygdala (A) and hippocampus (B).

Figure 7. Poster 3: Irritability/Anger
Topics Covered

1. What is Major Depressive Disorder?
2. Symptoms of MDD
3. Neurotransmitters involved
4. Medications that may help

Figure 8. Still shot from animation showing topic overview.

Figure 9. Still shot from animation outlining how MDD can affect someone.
Figure 10. Still shot from animation showing the three globe views and USA scaling out from globe 3.

Figure 11. Still shot from animation describing MDD incidence in the USA.
Figure 12. Still shot from animation reviewing the mental health professionals able to diagnose MDD.

Figure 13. Still shot from animation showing list of symptoms. As symptoms were said, they were highlighted in the list to draw the attention of the viewer.
Figure 14. Still shot from animation where neurotransmitters were described.

Figure 15. Still shot from animation describing neurons.
Figure 16. Still shot from animation introducing the three specific neurotransmitters associated with MDD.

Figure 17. Still shot from animation describing importance of serotonin.
Figure 18. Still shot from animation describing importance of norepinephrine.

Figure 19. Still shot from animation describing importance of dopamine.
Figure 20. Still shots from animation introducing synapse structures and functions; contrasted with synapse with MDD.

Figure 21. Still shots from animation describing effects of low serotonin; shows text enlargement when affect was called.
Figure 22. Still shot from animation describing effects of low norepinephrine.

Figure 23. Still shot from animation describing effects of low dopamine.
Figure 26. Still shot from animation demonstrating how SSRIs, SNRIs, and TCAs work at the synapse.

Figure 27. Still shot from animation demonstrating how MAOIs work.
Figure 28. Still shot from animation where other symptom management methods were introduced.

Figure 29. Still shots from animation showing animation ending.
REFERENCES


