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# Bridging the Synapse: Seeing the World Through a Neuroscience Lens

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Chancellor's Honors Program

Honors Thesis

*Bridging the Synapse:*

*Seeing the World Through a Neuroscience Lens*

Madeline MacArthur

University of Tennessee, Knoxville

Spring 2019

## **Thesis Content**

This thesis consists of eleven podcast episodes, this reflection, and links to our various social media. This document supplies background information, production process, and advice for future podcasters.

Such topics covered in this reflection include what is *Bridging the Synapse*, about our audience, about the episodes, the episodes and their summaries, an example of how an episode is created, about advertising, episode teasers, advice to future episode podcasters, what this experience has taught me, a brief autobiography, and links to the podcast and our social media.

## **What is *Bridging the Synapse***

The podcast began as the brain-child of my co-host, Anu Kumar. Anu started it back in fall of 2017 with the title *Brain Rules*. I became a co-host in January 2018. I learned about her idea while studying abroad in Spain, and when I returned, we hit the ground running, producing bi-weekly episodes focusing on everything from love's effects on the brain to circadian rhythm to Alzheimer's disease.

We produced the podcast *Brain Rules* together with *The Daily Beacon*, which is the University's student-run newspaper. During fall semester 2017 and spring semester 2018. Then Anu and I decided to become independent and produce the podcast on our own. We changed the name of the podcast to *Bridging the Synapse* in order to have a clean break and avoid any possible confusion with *The Daily Beacon*. However, the content, length, and style of the podcast stayed the same.

The podcast was created with the objective to explore the research and discipline of neuroscience and relay our findings to the public through an exciting and informative platform.

As the co-host, co-writer, and co-producer, I choose the focus of the episode each week, investigate relevant research, write the script, and record and edit the episodes.

The idea for using the podcast as the basis of my thesis began last semester when I fully realized the uniqueness of a project like *Bridging the Synapse*. I should note that my co-host Anu Kumar is not a member of the Chancellor's Honors Program at the University of Tennessee, Knoxville. Even though she is not a member, she encouraged me to use the podcast as the focus of my thesis.

Since the beginning, Anu and I have completed eleven podcast episodes, all of which are available for free on Anchor or any other stock podcast app. Anchor is a free podcast app where you can record, edit, and release a podcast all on one site. The site then releases the episodes on other sites such as Apple Podcasts, Google Podcasts, and Spotify. The website also creates a profile page for each show, so that way it's easy to keep all of the episodes in one place. We plan to complete one more episode.

### **About Our Audience**

Based on who has told us they listen to the podcast and who follows us on social media, we know most of our listeners are from the United States. However, since we release our podcast through Anchor, we know from our Anchor data we have listeners in 36 countries with the majority of our listeners residing in the United States, South Africa, the United Kingdom, Australia, and Germany. Our average audience size is 20 people, but we have had a total of 776 total plays of our episodes. These numbers were based on the reports from April 19, 2019.

Most of our comments on the podcast have come from in-person encounters. Since I have a few friends who listen to the podcast, they give me feedback on things they liked and ways the

podcast could be improved. We have not received many comments online, and when we have, they have been short positive reviews.

We started this podcast purely out of fascination with neuroscience and the desire to share our enthusiasm with the public. Listening to podcasts has always been a passion of mine, but *producing* a podcast is a different experience. How to communicate a complicated scientific topic to the public and create understanding is a skill.

### **About the Episodes**

Each episode is chosen based on what is happening in the local community, what we are learning about in our major classes, and topics that we personally want to investigate. The episode topics we have covered this school year (2018-2019) so far include: *Familiarity, Enteric Nervous System, Study Skills, Fear, The Common Cold and the Brain, Coffee, Blue Light, Heartbreak, Art and Behavioral Health, and Stress and Anxiety*. We have one more episode planned for the end of the semester. The final topic will be about *Goodbyes*, and it will be the episode where Anu and I say goodbye to *Bridging the Synapse* and our undergraduate education.

The planning that goes into each episode begins with Anu and me discussing what topics we would be interested in exploring. We jointly research the topics, find out if it is possible to create an episode from our research, write a script for the episode, then record the episode within a few days of writing the script. We both do everything, and our roles are interchangeable. We also contact people who could be a guest on that episode. Our ability to have a guest depends on whom we have access to for free at the University of Tennessee, Knoxville. Philosophically, we seek a person who is an expert in their field because we want reliable sources that can elevate the

podcast. We have interviewed undergraduate students, graduate students, professors, community organizers, and even a barista for our episodes.

The whole process of creating an episode from choosing the topic to releasing it takes about a week. We release an episode every other week with the exception of winter break during the regular school year.

The topics are chosen because we think these subjects will be relevant to college students and people interested in neuroscience podcasts. We started the podcast by asking ourselves, “I wonder how this topic relates to neuroscience” or “I wonder if anyone has investigated the connection between this topic and neuroscience.”

Because the podcast began as a fun project that we started for our own musings, the episode topics are always related to something we are personally interested in. Once each topic is chosen, we search through our class PowerPoints, scientific articles, the library catalog, and, of course, the internet to find reliable sources for our discussion. The guests on the podcast also supply scientific articles and their own experiences.

## **Episodes and Summaries**

### *Familiarity*

In this episode, we discuss coming back to school and this being our last year undergraduates. We also discuss déjà vu and why it takes so long to get used to a new place.

### *Enteric Nervous System*

In this episode, we discuss what the enteric nervous system is and why it’s so important to our bodies. This system exists in the gastrointestinal tract and acts as a “second brain.”

### *Study Skills*

In this episode, we discuss the importance of creating effective study skills and how we remember information. We also discuss different strategies you can use to study more efficiently.

### *Fear*

In this episode, we discuss what happens in our brains when we experience fear, why you sometimes enjoy fear on rollercoasters and in haunted houses, and some rare conditions that are related to fear.

### *The Common Cold and the Brain*

In this episode, we discuss the effects of the common cold on the brain and why we mostly get colds in the fall/winter months. We also discuss why we feel sluggish when it's dreary outside.

### *Coffee*

In this episode, we discuss coffee as it relates to the brain, society, and culture. We speak to a barista and fellow undergraduate neuroscience major about the intricacies of coffee's effects on the brain.

### *Blue Light*

In this episode, we discuss blue light, its effects on our eyes, and how we can see different colors. Blue light is the light that is emitted from computer and digital screens. This light can cause problems with human eyes.

### *Heartbreak*

In this episode, we discuss heartbreak as it relates to our brain and how the effects mimic withdrawal from drugs. We spoke with a graduate biochemistry and biomedical sciences student about heartbreak's effects on the brain and possible coping strategies.

### *Art and Behavioral Health*

In this episode, we discuss the stigmas surrounding mental illness and how some people use art to cope with their mental illness. We also discuss resources available to UTK students who need help.

### *Anxiety and Stress*

In this episode, we discuss how stress and anxiety effects our brains, what neurotransmitters are involved. We also discuss possible coping strategies that can be used to deal with stress and anxiety.

### *Goodbye*

In this episode, we will say goodbye to *Bridging the Synapse* and undergraduate education while also investigating what is happening in the brain when we experience loss and change.

### **An Example of How an Episode Is Created**

Anu and I meet every week to either write an episode or record an episode. When we wrote the script for the *Coffee* episode, we decided to focus on this topic because we had both just taken a *Drugs and Behavior* class the previous semester and were fascinated with the effects of coffee on the brain. We pulled information from that class, including PowerPoints, research articles, and the textbook, to begin forming the script.

We also decided to interview my housemate Gabe Taylor because not only is he a barista but a fellow undergraduate neuroscience major. We knew we wanted the interview with Gabe to be at the center of the episode plus more detailed information on what is happening chemically in the brain. Before we interviewed Gabe, we sent him a list of questions listed below:

- Tell us about yourself. How long have you been a barista?
- What drew you to coffee?
- As a neuroscience major, what do you know about coffee's effects on the brain?
- What do you think about how coffee has become such a fashion statement today?

The actual recording of this episode did not go as planned, because Gabe and I could not record in the soundproof studio Anu and I usually use. We had to make do with an extra room in our house that was anything but soundproof. The interview took about 30 minutes, then Anu and I met up later to record our introduction, our introduction of Gabe, the effects of coffee on our brains, and the outro. This is usually the format an episode with a guest.



When there is no guest, we start with the intro, then insert our findings on the topic, try to end on a positive note, then have the outro.

This format has stemmed from what I have heard from podcasts such as *Outside/In*, *Neighbors*, and any NPR show. However, since neither of us has never taken a journalism or audio production class, we were mostly patterning our episodes on what we had listened to before.

The episodes vary in length. At the beginning of the project we tried to aim for 20 minutes for each episode. This did not work because sometimes we wanted to include more than 20 minutes worth of content into an episode. If an episode is shorter than 20 minutes, it usually indicates that we underestimated the amount of material we had. We do not use editing to significantly shorten the episode. We mainly use it to remove “ums,” unnecessary pauses, or mistakes when reading the script.

Once we record the episode, we then have to edit and release it. Anu and I both edit the podcasts every week. We use free software called Audacity to edit the episodes and use music from Podington Bear. Podington Bear is a free music service that anyone is allowed to use as long as credit is given to the creator.

We release all of the podcasts on the website / app Anchor. Anchor then releases the episode onto all podcast streaming services. We also advertise the episodes on Facebook, Twitter, and Instagram.

### **About Advertising**

For each episode, we advertised the contents of the episode with a short teaser. We used the same teaser for Facebook, Instagram, and Twitter. These teasers are also listed on the

website. We did not do anything else outside of these three platforms to advertise our show.

Below are the teasers for each episode.

Since this was such a new and experimental experience, we were just trying to get some word out about our podcast to anyone who would listen or look us up.

## **Episode Teasers**

### *Familiarity*

Welcome back to school (and this podcast)! Ever wonder why it takes us so long to get adjusted to a new place, or why we feel random bouts of déjà vu? Previously dubbed the *Brain Rules Podcast*, join Madeline and Anu as they answer these questions and more on the first episode of the *Bridging the Synapse Podcast*.

### *Enteric Nervous System*

How does your brain work in harmony with your stomach? Did you know that neurons can exist outside of your brain? Or that feeling "hangry" is regulated by another system in your body? Anu and Madeline talk about the Enteric Nervous System, or "the gut brain," in this episode of the *Bridging the Synapse Podcast*.

### *Study Skills*

Is there an effective method of studying? What factors contribute to our ability to remember important information? Anu and Madeline explore what it means to be a busy college student with some throwback audio to the original *Brain Rules Podcast*.

### *Fear*

Happy Halloween! Why do some people like haunted houses? What makes you feel fear? What is happening in your brain that makes you either run or fight? Join us on this latest episode to learn more about fear.

### *The Common Cold and the Brain*

Ever wonder how you get a cold? Why do you only get colds in the fall / winter months? Why do you always feel sluggish when it's dreary outside? Find out on this latest episode!

### *Coffee*

The cultural phenomenon that surrounds coffee runs deep from a social and neurological perspective. Special guest Gabe Taylor, a neuroscience undergrad at the University of Tennessee, Knoxville and Starbucks barista, join Anu and Madeline on the premier episode for the 2nd season of *Bridging the Synapse*.

### *Blue Light*

What's all the hype with blue light? How does our brain know the difference between colors? Tune in to the latest episode of *Bridging the Synapse* to learn more about how light is processed and perceived. Special guest Brandon Barker, a physics and mathematics undergrad at the University of Tennessee Knoxville, joins Anu and Madeline to discuss the mechanics behind blue light.

### *Heartbreak*

What happens in your brain when you go through a breakup with a significant other or a best friend? What are some effective (and not so effective) coping mechanisms? University of Tennessee Biochemistry and Molecular Biology PhD Candidate Dana Layo guest stars on this week's episode to talk about our addiction to love.

### *Art and Behavioral Health*

What stigmas surround mental illness? How can people express their struggles through art? Tune in to the latest episode of *Bridging the Synapse* to learn more about the stigmas and struggles surrounding mental illness. Special guest Catherine Siravantha, a psychology and film studies undergrad at the University of Tennessee Knoxville, joins Anu and Madeline to discuss how artistic conceptualization relates to behavioral health.

### *Stress and Anxiety*

Have you ever felt anxious or stressed? Of course, you have! You're human. Wonder how you can better cope with your stress and anxiety? Tune in to the latest episode of *Bridging the Synapse* to learn more about stress and anxiety processing disorders.

*Goodbye* – under development. Episode will be released on May 8, 2019.

## **Advice to Future Amateur Podcasters**

If I were to go through this experience again, I would start by taking an audio journalism class to learn the basics about audio editing, production, and release. We went into this project with only an inkling of how to create a podcast. We had no real training and had to teach ourselves everything.

I would also make practice episodes that we would not release. This sounds like common sense, but the audio we used to practice editing with is the same audio we released on the podcast. This is why the editing and sound quality of our podcasts can vary dramatically.

I want to caution any college students who want to make a podcast to consider their workload academically and outside of the podcast before committing to a podcast. Since we were self-taught audio producers, we had to spend a lot more time editing and writing scripts in the beginning. Eventually it got easier, but the number of hours spent at the beginning of each semester planning out topics and scripts and when to record and who would edit took a lot of time. Also, we only had each other to depend on, so if one of us could not do something, then it fell on the other person to step in.

I urge anyone wanting to create a podcast to take a couple months before releasing your first episode to plan out your topics, write the scripts, record the audio, practice and complete edits, and then figure out how you will advertise your project. Doing more planning on the front end will take a lot of time and will delay gratification, but it will make your life significantly easier. Also, it will only improve the quality of your podcast, because it is something you have cultivated over a long time and given more thought to.

## **What This Experience Has Taught Me**

From this experience I have gained a better understanding of how to read research articles for synthesis, how to verbally structure the message to the public, and the technical aspects of producing a podcast program. I learned practical skills such as how to record a podcast, how to edit the audio, and how to upload the audio for others to listen to.

We had to advertise the podcast on social media platforms, so I learned how to create posts that would get people engaged and intrigue them enough to want to click on the podcast. How to communicate a complicated scientific topic to the public and create understanding is a skill I have gained.

For me, the most vital lesson from this experience has been learning the importance of story-telling. I know which episodes are more powerful and more effective than others simply because they possess better stories.

When the audience has something in their own lives to relate to the episode's story, this makes the audience have a connection to the hosts and the story. I cannot expect the audience to memorize facts about the brain, but I try to make what is happening in the brain relate to their everyday lives and get them thinking about how neuroscience is applicable to their lives.

My whole motivation behind wanting to start a podcast stems from my curiosity about science communication. It seems as though it's always scientists versus everyone else trying to explain to the world why scientific research is valid and necessary. I believe it is the responsibility of the scientists to learn how to communicate their ideas effectively so that the public, not just other scientists, can understand their research. I am currently taking a class where we review journal articles and discuss the research, the results, and how the research is presented within the article. We discuss the layout of the article and how it can be improved. Conversations

and classes such as these are vital for STEM majors to learn how to effectively communicate their research to an audience of scientist.

With a podcast you have to practice communicating your ideas verbally and not in a written form. When writing our scripts, Anu and I are constantly asking ourselves if what we are saying will make sense to people or if this idea will only make sense to someone with a background similar to ours.

These questions are important to ask ourselves, because we have to ask who our audience is and if the audience we are targeting will be able to understand what we are trying to communicate. More scientists need to ask these questions of themselves when they are talking or to the lay public.

There are constant debates about climate change, mental health, and other hot topics happening every day. The term “pop psychology” has even become popular, because it is psychological research that has been validated not by research but by the opinion of the public.

I look toward the future of science communication as an exciting field of possibility. What I have learned from this experience is how to be more reflective when I’m communicating. I ask myself who can understand what I’m talking about. Am I providing enough background information? Do I need to provide definitions?

Even though I cannot say for certain that I have succeeded in improving my science communication skills, I certainly feel as though I have learned how to think about science communication and learned more about its importance in today’s world.

The most unexpected and challenging lesson to learn was being a partner in a project such as this. Anu and I had to make a yearlong commitment to each other that we would record and release a podcast every other week during the semester. It’s a different experience from

when you have a professor grading the work and keeping you accountable to deadlines. There was no professor holding us accountable. We had to hold ourselves and each other accountable. I learned how to resolve interpersonal conflict so that we could decide to do what was best for the project. I'm grateful for this experience, and especially grateful for having pursued such a fun and challenging project with a great friend.

We chose to create a podcast because Anu and I are both passionate podcast listeners. We were fascinated by our neuroscience major and had the desire to share our enthusiasm with the public. Podcasts have always been a passion of mine, but producing a podcast is a different experience. The whole thesis of the podcast is to explore the world from a neuroscience perspective. We want to show that from the perspective of neuroscience, you can have exciting insights into the world around you.

### **Link to Podcast**

<https://anchor.fm/bridging-the-synapse>

### **Links to Social Media**

Facebook:

[https://www.facebook.com/BridgingtheSynapse/?view\\_public\\_for=508323136280061](https://www.facebook.com/BridgingtheSynapse/?view_public_for=508323136280061)

Instagram:

<https://www.instagram.com/bridgingthesynapse/?hl=en>

Twitter:

<https://twitter.com/SynapseBridge>

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## **About Myself**

I am writing this thesis as a senior at the University of Tennessee, Knoxville. I started my undergraduate career as undecided in August 2015, but soon settled on the neuroscience major. I will be graduating Magna Cum Laude in May 2019 with a Bachelor of Arts in Neuroscience with minors in Psychology and Hispanic Studies. I have spent the last four years pursuing my education at UTK and abroad at Universidad de Granada in Granada, Spain during the fall 2017.

During my time at UTK, I have worked as a tutor for the Center of Multicultural Student Life. I have also worked as a Student Librarian Assistant, an Office Assistant in University Housing, and a Conference Assistant in University Housing.

I have spent time outside of school and work volunteering at the East Tennessee Children's Hospital for almost a year and a half. I have also spent time working as a research assistant under Dr. Keerthi Krishnan and Dr. Hollie Raynor.

Looking towards the future, I will continue to take classes at UTK for the summer and fall semesters 2019 with the hopes of starting Physician's Assistant school in May 2020.