Library Research Award

Reflective Essay

Neuroscience satisfies both my academic and social self. Both neuroscience and biology serve to compartmentalize large systems into smaller parts that are used jointly to understand complex systems and advocate for marginalized groups to improve mental health care. We now use neuroscience to help vast populations of vulnerable minorities, especially within psychology research. For these reasons, I am partial to the topics of neuroplasticity and depression. Learning about depression has helped me to better advocate for others and myself, especially in regards to destigmatizing mental health and treatment. Moreover, understanding the biological components of depression engenders a feeling of optimism and confidence in regards to the pioneering work done to improve treatment opportunities for those with depression. Even with this motivation, pursuing this project was intimidating. Since I have not taken any formal neuroscience courses yet, reading scientific journals was challenging and confusing. The extreme breadth of information concerning this topic complicated structuring and organizing my paper. These roadblocks did not discourage me, though. The campaign to form my piece was fraught with confusion, but because of my determination and perseverance, I now feel incredibly capable and confident in my ability to work with neuroscience research.

I set out first by entering the keyword “neurogenesis” into the UW Libraries database. I knew about neurogenesis as the process of proliferating and maturing new cells in the brain from previous self-study. My search evolved to “neurogenesis AND depression” and shortly became “neurogenesis AND depression AND hippocampus AND hippocampal.” I excluded everything (books, newspapers, webpages) except peer reviewed research articles and journals. It was fascinating, yet overwhelming to discover how many facets there were to my research question. Everything I found felt vital, so I reached out to my instructor and UW Library staff for help

narrowing my resources down. Upon advice from my instructor, Christina Ma, and UW Library staff Sally Pine, I began using PubMed, the National Center for Biotechnology Research, PsychInfo, and WebOfScience, as these sources would likely have research more specific to my topic than the UW Libraries website. Most of my articles were from Elsevier and ScienceDirect, but a few were from sources new to me, including the Public Library of Science and Frontiers. I prioritized articles written in the last five years, and I did not use citations as a measure of worth. Instead, I focused on the titles and the abstracts of the articles I found to make quick judgments on whether to save the source. After collecting around 30 articles, I read through the introduction, discussion, and conclusion of each one and narrowed the count to 20 based on uniqueness and pertinence to my question. As my research went on, I looked for more articles on specific subjects related to my thesis. I added the terms “inflammation" and "neuroinflammation" for my treatment section and searched for articles on "women in scientific research" for my discussion. I also used a great deal of background information to support my paper. I found articles solely on the hippocampus, depression, and neurogenesis for the introduction, and read journals focusing on general inflammation and immunity to support my descriptions of the depression-inflammation hypothesis.

Even though determining my search terms was relatively straightforward, deciding which direction to go based on the wealth of articles was more challenging. After reading the article Neuromodulation and Hippocampal Neurogenesis in Depression by Beurel et al., I realized that the findings were bidirectional: neurogenesis causes changes in depression, and depression causes changes in neurogenesis. This resulted in some confusion about what the intent of my work would become. I had previously only considered the depression-first route. Seeing more to the story was unexpected, especially as someone who’s understanding of neuroscience has been

self-taught. Furthermore, learning about this topic from only scientific journals was formidable. It is rare to write a journal article meant for a beginner in the field – most works are for those who already have a basic understanding of the topic. This fed into yet another issue with designing my paper: I did not know how broad to keep my scope. If I did not understand certain parts of the topic from only a few readings, my audience would not either. More specifically, I struggled to decide how much of the molecular machinery to describe and at what level to explain gene expression and immunity. I could read papers carefully and puzzle together an understanding of the discipline, but my audience would not have the time or resources to do the same. Further, the point of my paper was not to motivate self-study of the topic, rather I wanted it to be accessible to a broad audience and avoid the issues I was faced with when researching the topic. Thus, most of my problems arose from a lack of an official neuroscience background, causing a lack of confidence when designing my paper.

I found the best way to overcome these roadblocks was to begin writing immediately. As I read my sources, I compiled the evidence using Padlet, an online tool where users can upload, organize, and share content to virtual bulletin boards called "padlets". I color coded my evidence according to direction (*neurogenesis to depression* or *depression to neurogenesis*), whether it talked about gene expression or treatment, and if it talked about the immune system. This became unsustainable as my evidence accumulated, so I decided to move on from resource collection. Once I began writing, I could immediately see what sources worked together and which did not. I also spoke to my instructor and employed the undergraduate research tutorial Canvas course provided by the UW Libraries to help choose the most pertinent information. Through their advice and stream-of-consciousness writing, I was able to decide which sources should be excluded. I also reflected on what failed in the articles I had read and incorporated the

opposite into my writing. This was achieved by including in depth explanations that can be understood by laymen, and avoiding descriptions of experimental techniques. I also used language that would resonate with my novice readers – namely, I strived to bring the focus back to depression and mental health often. Finally, I had many friends with a range of prior knowledge about neuroscience review my paper. After creating a rough draft, I sent it to my editors with the instruction to highlight anything that did not make sense. Through their critiques and careful rereading of my work, I was able to elevate my paper to become more accessible to a larger audience. It was especially helpful when my readers asked me to explain concepts that they felt were unclear. More often than not, I found that I was unprepared to describe the information in detail, and this spotlighted the subjects I would need to re-research. This was also a symptom of my lack of prior knowledge on the topic. Using this weakness to my benefit, I was able to level with my readers as a novice, and they helped me understand what I had to improve upon to put myself in the expert teaching position.

Facing these issues was incredibly challenging. It took weeks to understand how I wanted to present the information. A lot of the battle was in my level of education, but I still took away several valuable lessons for future work. I plan to pursue a Ph.D. in neuroscience, and I am hoping to pursue science communication post-baccalaureate, so having this opportunity to practice interacting and working with my audience is valuable. In the future, I will utilize more diverse resources to avoid the confusion I faced throughout. Furthermore, I will consider my audience from the beginning of the process, as I did write some parts of my draft with the intention for the audience to be in my discipline, only to change it later. Lastly, I will embody more confidence in the writing process. I had to change the structure and my thesis several times to complement the latest research in this field along with my changes in scope. It felt painful at

the time, but I realize now reflecting and restructuring is a necessary part of this work and reaching my goals.

Ever since I was a child, I wondered why others weren't more curious about the things that we take for granted, namely the brain. By pursuing this project, I've revitalized that curiosity, and become confident in my ability to pursue neuroscience further. Though I have a personal connection to neuroscience, I was not sure how expansive the research on neurogenesis and depression was. I am now certain that I have a future in this field. The experience I have gained here, both in writing and research, will help me pursue my degree and the work I will do afterward. For instance, the bidirectionality I discovered allowed me to broaden my perspective on experimental design and research. I now see the importance of examining the subject from multiple perspectives and will employ this when considering the research I do in the future. This was especially true with this topic, as it turned out to be incredibly interdisciplinary, with research from seemingly unrelated areas (autoimmune disorders) being instrumental in exploring new treatment opportunities (anti-inflammatory drugs) as described by Flores et al. I am also more informed on what is lacking within the research. I found a distinct lack of focus on women and neurodivergent folk. Though human research is hard to come by with some neuroscience topics, research on female rats is possible and realistic. Understanding this allows me to be aware of how to make this field more equitable and comprehensive for diverse populations. Reflecting back, I feel very emotionally and academically fulfilled by this project. As my ability to read and write academic research has improved, so too has my confidence in overcoming challenges in the research process.

References

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