Selina Wang and Sean Bai explore relationships between music, memory, and Alzheimer's disease

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By Queen’s Psychology
Photo by Eric Brousseau

Undergraduate students Selina Wang and Sean Bai want to see music therapy more widely used to help improve the lives of the elderly and individuals struggling with Alzheimer’s disease. According to Alzheimer’s Society Canada, 747,000 Canadians were living with cognitive impairment in 2011, including dementia. That’s 14.9 per cent of Canadians 65 and older. There is no known cure for Alzheimer’s disease and the effectiveness of current treatments is limited. The students hope that music therapy can be the convenient and immediate alternative for alleviating some symptoms of Alzheimer’s disease.

“I used to volunteer at care homes where I played piano for elderly residents. I noticed that even though many of the residents with Alzheimer’s disease had difficulty speaking, they often responded to familiar melodies by humming with the music”, Selina recalls. “I began to wonder whether there are scientific studies that show music can trigger memory or improve patients’ quality of life. It was during the second semester of her third year when Selina was looking for a supervisor for her Neuroscience 499 project that she met Queen’s Psychology’s Dr. Lola Cuddy. “Since I had always been interested in music and memory, I hoped to conduct a research project that combines aspects of both music and memory”, Selina recalls. “As I was searching for a potential supervisor who specializes in this research field, I found Dr. Cuddy. Dr. Cuddy is a leading expert on the research of music and memory, and several years ago published a case study suggesting that musical memories of a patient with Alzheimer’s disease may be spared”, Selina explains. In 2014 Selina met with Dr. Cuddy to discuss the projects that the Music Cognition lab was currently involved in. The research project that drew Selina’s attention was the music-evoked autobiographical memory (MEAM) study. Selina decided to volunteer in Dr. Cuddy’s lab to take part in the MEAM study.

Sean adds, “Being a musician myself, I have always been fascinated with the possibility of what music had to offer the mind. When I first heard about Dr. Cuddy’s lab, it was the first time I had heard about music psychology being studied in a university setting”, Sean says. “So I applied to work in her lab as a research assistant. Through my work in the lab, I became interested in how music could act as a therapeutic tool for individuals who have Alzheimer’s disease”.
Sean’s own study focuses on MEAMs. “My study compares music-evoked autobiographical memories between young and older participants and between healthy older adults and Alzheimer’s patients”, Sean explains, “and looks for evidence of the positivity effect. One manifestation of the positivity effect is the phenomenon whereby, as people get older, their memories are more positive and less negative than those of younger people. In 2014 I helped with another study on the positivity effect. We interviewed older adults from the Queen’s and Kingston community and students, using music to evoke memories. What we found was that older adults tended to rate their music-evoked memories more positively and less negatively than did the students”.

Selina’s study, co-supervised by Dr. Cella Olmstead, takes these findings one step further. It aims to compare music-evoked autobiographical memories with autobiographical memories triggered by silent videos in young and older adults. The goal is to assess the effectiveness of music in evoking autobiographical memory as compared to visual stimuli alone. Participants for the study include cognitively healthy adults over the age of 65 and younger adults as well as young adults between 18 and 25 years of age. “In this study I will be examining the number of memories evoked, specificity, valence, age at which the event occurred, and the positivity effect”, Selina says. “My study attempts to confirm that this positivity effect in older adults is present in video-triggered memories videos just like it was observed in musically evoked memories. Basically, what I am doing is collecting empirical evidence to test this hypothesis”.

The long-term goal is to examine the positivity effect with individuals with Alzheimer disease. “Even though this positivity effect was observed in older adults according to a variety of memory studies, the results concerning its presence with Alzheimer’s disease are mixed”, Selina points out. “Some studies suggest the positivity effect is absent, whereas other studies indicate that the positivity effect is intact in Alzheimer’s patients. If this positivity effect can still be observed in Alzheimer’s patients, then we can theorize that the brain structures responsible for generating this effect may be intact as well. By testing the positivity effect, we can have a deeper understanding about Alzheimer’s disease and the progression of the disease.” As well, the students argue that if music can help to retrieve autobiographical memory, it is possible that music can also help those patients with memory loss such as patients with Alzheimer’s disease to restore memory.

Selina and Sean feel they have gained a great deal of theoretical knowledge associated with music and autobiographical memory while working in Dr. Cuddy’s lab and helping to run the MEAM study. They have also acquired essential skills required to run a study from recruiting and interviewing participants to data analysis. “From this experience, I discovered that I enjoy interacting with participants, especially the elderly”, Selina says. “This opportunity of working in the lab has given me a direction in terms of what is suitable for me and what I enjoy doing”.

Selina’s next goal is to use the knowledge and skill she acquired at Queen’s Psychology to help her earn a Master’s degree in Behavioural/Cognitive Neuroscience.

Sean’s post-university plans are to pursue a career in epidemiology. “I would be very interested in tackling this disease from an epidemiological and global standpoint, in hopes to better understand the disease, how to prevent it, and how to treat it”.