Preface

First of all, I would like to thank both Prof. Lowie and Dr. Quam for a wonderful internship experience. Their careful supervision made my time in the Child Language Learning Center at PSU a valuable and enjoyable research experience.
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Introduction

In the 2-year Research Master Language & Cognition at the University of Groningen, the third semester is devoted to a research internship, preferably in a different research environment. Students have the freedom to choose their host research facility themselves, and are encouraged to do so abroad. Therefore, I started looking for a research laboratory in the United States to spend my internship at. After some informal conversations with my supervisor Prof. Lowie, I decided to reach out to Dr. Quam’s laboratory, the Child Language Learning Center at Portland State University. Out of all ongoing research projects, Dr. Quam’s work on attrition in Mandarin-English bilinguals grabbed my interest the most. After contacting her and learning about each other’s research interests and motivation (which will be discussed later on), we signed a placement contract to intern at the above-mentioned project between August 15 and December 15, 2017.

In the remainder of this section, I will further discuss why I chose to work on a project studying attrition in Mandarin-English bilinguals, why I chose to work for Dr. Quam’s Child Language Learning Center. Lastly, I will provide a brief description of the Child Language Learning Center and its position within Portland State University.

Why the project on attrition in Mandarin-English bilinguals?

My fascination for bilingualism goes back as far as my early childhood. Because my mother’s Hungarian, and my father’s Dutch origin, I was raised with two mother languages in a Dutch environment. As a young child, I spoke both languages with ease. Sometimes, I would even switch between languages in the middle of a sentence, I was told. I took the gift of speaking two languages for granted. This changed after a move to Hungary at the age of 7. As my Dutch speaking father didn’t move with us, I was no longer using Dutch on a daily basis. By the time I graduated from elementary school, I
almost completely lost the ability to speak Dutch, and no longer considered myself as bilingual.

The experience of many of the Mandarin-English bilinguals that Dr. Quam’s project is investigating shows some similarities to my bilingual experience. Most of them were brought up in a Mandarin speaking country, with speaking Mandarin as a first language. Later in their lives, they moved to the United States or another English-speaking country and learned English as a second language. Previous work of Dr. Quam and colleagues (2017) found that the more proficient their participants were in English, the worse they were in discriminating tones in their native Mandarin. The phenomenon of losing aspects of one’s mother language is referred to as first language attrition (Schmid, 2011). Thus, the bilingual participants in Quam&Creel (2017) can be considered attriters: “Someone for whom the language of the environment is different from the language (s)he grew up with.” (Schmid, 2011, p. 12). The case of attrition and attriters is of course much more complex than that, which made it so appealing to me.

Why the Child Language Learning Center at Portland State University?

After sharing my interests in research with my home supervisor Prof. Lowie, he offered to help me find a suitable research laboratory in the United States. Prof. Lowie directed me to the website of the research laboratories at Portland State University. After some browsing on PSU’s website, I found information about the Speech and Hearing Sciences department and its recently established Child Language Learning Center. Dr. Quam’s profile listed the projects she was working on, one of them was the attrition study in Mandarin-English speakers. That same day, I sent her an e-mail about my interest in joining her research. After a few days of e-mail exchanges, we had an informal Skype call where we agreed on my future role in the project as a research assistant during a four-month internship period. Shortly after our Skype call, a contract was drawn up and signed by Prof. Lowie, Dr. Quam and me.
Organization: Portland State University, Speech and Hearing Sciences department, Child Language Learning Center

Portland State University is a public research university with an urban campus located in downtown Portland, Oregon, the United States. It is composed of seven constituent colleges. The largest college is the College of Liberal Arts & Sciences. Dr. Quam’s lab is part of this college. The Child Language Learning Center has a special focus on early language development research and developmental language impairment in preschoolers and adults as well. Because of these research focuses, most of the students working at the lab are undergraduate or graduate students in the Speech and Hearing Sciences program and only a few of them had a degree in Linguistics or other related fields. The collaboration in the lab with other research assistants with different backgrounds has given me insights in research areas I was not yet familiar with, for example in speech disorders or language impairment research.
Tasks

Before the start of the internship, my supervisors and I agreed on some tasks I would be working on during my internship. As I was to become a fulltime research assistant in the lab mostly run by part-time student assistants, we already anticipated on more workload than what we previously agreed upon. For instance, after the first week of the internship I was asked to become the project coordinator of the bilingual project. Not only my role in the project team was bigger than anticipated beforehand, we also expanded the monolingual project with two additional tasks. Being a project coordinator and setting up four experiments resulted in various tasks throughout my internship period. These will be described in the following sections in greater detail.

Making new stimuli

During my first week, I started designing the Mandarin stimulus for the bilingual discrimination study based on Quam & Creel (2017). Dr. Sarah Creel – Dr. Quam’s collaborator from UC San Diego – suggested to increase the number of stimulus words from the previous 28 to at least 100 to find more robust effects. The new stimulus words had to be one-syllable Mandarin minimal pairs, differing in tone, vowel or both. We also decided to restrict the possible vowels to six different vowels: u, ü, i, e, and o. As Mandarin words can have more than one meaning, we had to make sure to pick the most frequent meaning of the word. Additionally, the words had to be highly imageable in order to be presentable during the eye-tracking task. For making up the new stimulus words, I frequently consulted two Mandarin speaking lab members and asked them for their native judgements about the most frequent meaning of the words. Once we collected 97 Mandarin words that met all the criteria mentioned above, I recorded the sounds with a Mandarin native speaker over the course of four recording sessions. Then, I segmented and edited the sound files in the phonetics software Praat (Boersma&Weenink, 2009). After the stimuli words had been decided, we searched for
images on the Internet that matched the word meanings, and edited them to be used for the eye-tracking study.

Monolingual discrimination task

In Quam & Creel (2017), the attrition effects were found only for tones, but not for vowels. Following up on this study, we wanted to determine whether there was something unique about tones that lead to attrition in Mandarin, or if the reason there were no attrition effects found for vowels had more to do with the particular vowel contrasts that were used in the stimuli. One question that arose, was whether the tones used in the original experiment were less assimilable into English than the vowels. To potentially better equate the tones and vowels, we decided to use vowel contrasts that occur in Mandarin and not English. Before incorporating these new vowel contrasts into a new eye tracking experiment, we decided to run a preliminary study on English monolinguals where we had them discriminate the previous vowel contrasts, the new vowel contrasts, and the previous Mandarin tones. The goal was to determine discriminability of the different Mandarin contrasts by English speakers, as a proxy for comparing assimilability (into English) of the different groups of sounds.

Before implementing the new stimuli in the monolingual discrimination task, Dr. Quam suggested to run the experiment with the old stimuli in PsychoPy (Pierce, 2009). First, I familiarized myself with PsychoPy and designed an experiment with a ABX design, where A, B and X were Mandarin sounds, and either A or B were different tokens of X. In this discrimination task, English speakers were asked to listen to the three non-English sounds they heard and compared the third sound to the first and the second sound. They were asked to make a judgement about which of the first two sounds sounded more similar to the third sound. The words in the trials were minimal pairs, either discriminated by a vowel, tone or both. By manipulating the similarity of the sounds, we could see how well English speakers could discriminate vowels and
tones and also which vowels and tone they had the most difficulty with. Once the experiment was designed, I ran pilot experiments on five lab members. Then, I analyzed their data and reviewed literature on discrimination task designs (e.g. So & Best, 2014) and based on these observations, I adjusted the design of the experiment to make it more suitable for the monolingual discrimination study with the new stimuli.

Once the list of the new stimulus words was established and recorded, I applied the updated experiment design and ran a second pilot on the same 5 lab members. Their data has not been separately analyzed because they seemed to meet the participation criteria for the real experiment.

After the two pilot studies with the old and new stimuli on the lab members, I ran the monolingual discrimination test on 10 paid participants during the last four weeks of my internship.

Monolingual tone and vowel categorization task

During the literature review process for the monolingual discrimination task, I noticed that most studies studying discrimination also test the categorization abilities of monolingual speakers. After sharing this information with Dr. Quam and talking about possible research designs, we decided to add two monolingual experiments to the bilingual project: a vowel categorization and a tone categorization task.

By presenting English speakers with Mandarin sounds, we were aiming to get more insight in how they perceive Mandarin sounds and how they assign them into their native intonation and vowel categories. For these tasks, we designed two separate experiment designs in PsychoPy, recorded the English training words, created the data sources for both experiments. These two experiments were added to the experimental session during the last four weeks of my internship.

In the tone categorization task, English speakers were trained with English phrases to categorize in the following four English intonation categories: flat/neutral
tone, yes/no question, interrogating tone and exclamation. The aim of using these categories was to match them to the four tones in Mandarin as closely as possible. The categories were partly based on study designs in So&Best (2014) and decisions made in agreement with Dr. Quam. After the training phase with the English sounds, the testing phase started, where participants listened to the Mandarin sounds and were asked to categorize them in one of the four categories they learned in the training phase. If they could not tell which intonation category – tone – they heard, they could choose the option ‘other’.

In the vowel categorization task, English speakers were first familiarized with eight main vowel categories from the English vowel inventory by using following English example words: heed, hid, hood, hut, hoe, who, head and hot. In the test phase, they listened to Mandarin sounds and were asked to assign the sounds to these categories or to the category ‘other’ if they couldn’t tell which vowel they heard.

**Bilingual tone and vowel processing task**

The main experiment of the bilingual project was the bilingual eye tracking experiment. In this experiment, we were planning on testing Mandarin-English bilingual speakers on their discrimination abilities of familiar Mandarin words. The original plan for my internship was to start from designing the experiment with the already designed stimuli, test bilingual participants and analyze the collected accuracy, reaction time and eye tracking data. However, due to unexpected circumstances, these plans changed and before moving on to the experiment design and execution, I had to start with designing the Mandarin stimuli first (see section ‘Stimuli’). Around the sixth week, fellow project members and I recorded the words and looked for images and created eight trial orders during the last weeks of my internship. In the meantime, I started working on the design of the experiment using Experiment Builder 2.1.140 (SR Research, Mississauga, Canada). After consultations with Dr. Quam and an SR-research support specialist, we were able to successfully run the eye-tracking experiment in dummy mode (without
During the last two weeks of my internship, I tested three bilingual pilot participants with the eye tracker.

**Project coordinator**

In the second week, I was offered to be the project coordinator of the bilingual project. As I was the only fulltime research assistant in the bilingual team, I was able to keep oversight on the different tasks in all experiments. I was also responsible for dividing tasks among the members according to their availability and skills. My other task was to make sure that all project members (4 in total) filled out their availability in the lab schedule. During the last weeks of the internship, I was making how-to documents on how to run the experiments monolingual and bilingual experiments. I also trained project members by role play on how to instruct the participants, how to record their personal information and how to document the payment process. Furthermore, I was responsible for managing the project’s I-Drive folder where I updated the scripts and documents the team was working on. At the end of the internship, I made sure to update all documents – including experiments, scripts and data files – and label them transparently. By doing this, I made the transition of the project to a new project coordinator as easy as possible.

**Recruitment and testing of monolinguals and bilinguals**

For each of the monolingual and bilingual studies, we were aiming to test 30 participants each. Before testing participants, I had to complete the online training for human subject research called Collaborative Institutional Training Initiative (CITI). Furthermore, before the recruitment could start, the experiments had to be approved by the Institutional Review Board (henceforth IRB). The IRB approval forms were written by Dr. Quam and after revision, submitted by Molly Franz, the lab’s speech-language
pathologist. For the bilingual project however, I was responsible for updating the IRB document with the new experiments and protocols. This revision process took approximately four weeks. Once the IRB approved our research, I contacted the International Student and Scholar Services (ISSS) and Intensive English Language Program (IELP) to reach out to Mandarin-English bilinguals at PSU. I also contacted two Mandarin newspapers to advertise our study on their social media platforms, unfortunately without success. The monolingual participants were recruited in collaboration with the adult project in the lab. I scheduled the participants and research assistants and managed all communications regarding the schedules.

Additional work and experiences

Writing sessions
In week 10, Dr. Quam invited me to join her and another assistant professor at PSU on their weekly writing sessions. During these meetings, we set our writing and research goals. We also got back to the goals of the previous week and marked them as done or not done. These writing sessions offered me the possibility to share experiences and discuss planning with two experiences researchers. These writing sessions helped me to stay organized and to keep focus on my main priorities, which was essential managing four different experiments, the bilingual team and writing a manuscript on the mono- and bilingual studies. I learned how to set achievable goals, to break complex projects down into smaller tasks and to set appropriate priorities.

Lab meetings
On Fridays, we would have lab meetings where we would discuss the projects progress, talk about manuscripts, future research ideas and grant applications. I made sure to read the distributed manuscripts and to prepare follow-up questions and ideas for my fellow lab members on their work. In week 11 the lab meeting was focused on the
bilingual project. I distributed the manuscript of Quam and Creel (2017), that is the basis of the project. I presented the experiments we were working on to the other lab members.

**Manuscript**

As mentioned in the placement contract, I started working on a preliminary manuscript about the monolingual and bilingual experiments. Because the testing was still at an early stage when I started, I started writing the methodology section which we already agreed upon. Furthermore, I started a systematic literature review for the vowel and tone categorization experiments. This work is continued after the internship and refined as more data is being collected. Dr. Quam and I are collaborating through mail and work towards a joint publication in the near future.
Evaluation

Valuable contributions to the work of the supervisors and the receiving organization

I feel and I have been told that I have made multiple valuable contributions to the project of my supervisor, the Child Language Learning Center and the Speech and Hearing Sciences department at large. As previously mentioned, I worked as a project coordinator of the bilingual project on four different experiments. I have been able to recruit and test participants for three out of the four experiments and the fourth eye-tracking study was ready for testing by the last week of my internship. I also started working on the manuscript which forms as a basis for a jointly published paper with Dr. Quam, Prof. Creel and other research assistants who have been involved in the bilingual project. I was also involved in lab management tasks such as the IRB approval and daily tasks such as installing software’s on lab computers. Furthermore, I have contributed to other projects in the lab by helping my fellow lab mates trouble shooting in PsychoPy or serving as a pilot for their experiments.

Implemented skills and knowledge

During my internship, I have employed several new skills. At the beginning of my internship, I learned how to apply theories and methods I read research articles relevant for our own research design. I also got to learn about bilingualism and attrition in bilinguals while doing literature study and discussing them with Dr. Quam. I learned how to design experimental stimulus in Mandarin to fit the research goals of a specific behavioral study on vowel and tone discrimination and categorization in monolinguals and bilinguals. Reading research articles also improved my critical thinking about research methods in mono- and bilingualism research. Furthermore, I acquired the skill to design experiments in PsychoPy, and by the end of my internship, I also improved in reading error messages and resolving them. I learned how to set up an eye-tracker and
how to run the experiment with it. I also learned how to analyze pilot data and how to implement the preliminary results to make changes in a new experimental design. I learned how to recruit and schedule participants efficiently. I also became fairly proficient at running three experiments during the same session. I learned about research ethics in the United States by completing the CITI training and being involved in IRB applications for the lab. As being the project coordinator of the bilingual project, I learned how to align team member’s schedules and assign tasks among them according to their abilities and availability. By being part of a writing group, I learned how to stay organized when several small experiments are run simultaneously and how to prioritize tasks on a weekly basis. By attending weekly lab meetings, I learned about other research in the lab and learned how to contribute new ideas to projects I am not directly involved in.

**Learning goals**

The following learning outcomes were outlined in the placement plan:
- recruit participants
- develop and run a behavioral experiment
- analyze the data of the experiment
- report on the experiment, preferably in the form of a publication

Due to the unexpected tasks at the beginning of the experiment concerning the making of the stimulus words, I haven’t met the goal to analyze the data during my time in the lab. I have been able to set up the eye-tracking experiment and run three pilot participants. I was also able to start on reporting on the experiment by putting the introduction and methodology section on paper. Because the original agreement only included the bilingual experiment and I ended up setting up three monolingual experiments, worked as project coordinator of the team and was involved in applying for IRB approval, I think I achieved more than I expected by working on so many
different goals and could contribute to the project and the lab in general on more levels than I expected beforehand.

**Supervision**
My home supervisor Prof. Lowie has been a great help during my internship at PSU. In addition to the mandatory Skype calls halfway through and at the end of the internship, we had more phone calls and several e-mail exchanges about my internship. During these conversations, I updated him on my progress in the lab and he gave me useful advice on how to work more efficiently in a laboratory setting. He also gave me advice on how to prioritize work. He also helped me with applying for extra credits for my university as my tasks grew bigger in the lab.

My local supervisor Dr. Quam has been a great supervisor to work for. She always made time to sit down and talk about the research and help solve problems when needed. I always felt welcome to walk by her office and consult her about any other subject. She trusted me on the tasks that she assigned to me and she regularly provided feedback on my work. She also seemed to be open for new ideas which made our collaboration very fruitful. She created a hospitable environment by inviting me to the weekly writing sessions and including me in discussions other projects. I am very grateful for the energy and time she invested in the bilingual project and therefore in me. Her careful supervising provided me with a challenging, fruitful and enjoyable internship experience.

**Career perspectives**
The biggest contribution of this internship for my future career in academics has been all the newly acquired knowledge and skills in designing and running experiments, coordinating a team of fellow research assistants and being involved in general lab management tasks. Dr. Quam and I will keep collaborating after my internship is over and publish a paper on the monolingual and bilingual studies. Dr. Quam also offered me to return to the lab as a paid research assistant to analyze the data and work on the
manuscript together. This is of course a great opportunity to keep working on our project and to gain more research experience.

This internship may also provide a solid basis for a subsequent MA thesis. Although there are no plans made yet, I might expand the current project by testing monolingual and bilingual speakers in the Netherlands. Comparing and contrasting the findings of that research to the current project could lead to interesting findings.

I am also grateful for the researchers I got to know at the Speech and Hearing department who told me about their work as a speech pathologist and academic researcher. After talking to them, I became interested in doing more research on speech disorders and maybe even pursuing a master’s degree in speech pathology.
Conclusion

Even though I did not get to test bilingual participants with the eye tracker and analyze their data, my time at PSU was more than worthwhile. I got the chance to set up three monolingual experiments, pilot, analyze the pilot data and test actual participants. During this process, I learned about various aspects of experimental research like research ethics, recruitment, analyzing pilot data and running several experiments in the same session. I also improved my supervising skills by being the project coordinator of the bilingual project. By reading the relevant literature, I learned how to implement theory and research practice to designing own experiments and I also learned about attrition and bilingualism research in general. This new knowledge about theory was also useful when I started working on the manuscript which we hope to keep collaborating on together and publish it in a journal article. All in all, my time at Dr. Quam’s lab in the Speech and Hearing Sciences department at Portland State University has been productive, challenging and the most wonderful research experience I could ask for.
References


