

Eastern Kentucky University

Encompass

---

Online Theses and Dissertations

Student Scholarship

---

January 2022

## "I Could Not Understand Anything They Said!": Non-Native English Speaking Instructors, Online Learning, and Student Anxiety

Katelyn Lee McClure  
*Eastern Kentucky University*

Follow this and additional works at: <https://encompass.eku.edu/etd>



Part of the [Psychology Commons](#)

---

### Recommended Citation

McClure, Katelyn Lee, "I Could Not Understand Anything They Said!": Non-Native English Speaking Instructors, Online Learning, and Student Anxiety" (2022). *Online Theses and Dissertations*. 742.  
<https://encompass.eku.edu/etd/742>

This Open Access Thesis is brought to you for free and open access by the Student Scholarship at Encompass. It has been accepted for inclusion in Online Theses and Dissertations by an authorized administrator of Encompass. For more information, please contact [Linda.Sizemore@eku.edu](mailto:Linda.Sizemore@eku.edu).

“I COULD NOT UNDERSTAND ANYTHING THEY SAID!”: NON-NATIVE ENGLISH SPEAKING INSTRUCTORS, ONLINE LEARNING, AND STUDENT ANXIETY

BY

KATELYN LEE  
MCCLURE

THESIS APPROVED:

*Hung-Tao Michael Chen*

---

Chair, Advisory Committee

*Jonathan S. Gore*

---

Member, Advisory Committee

*Michael J. McClure*

*Ry K. Baggett*

---

Dean, Graduate School

## STATEMENT OF PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for a Master of Science degree at Eastern Kentucky University, I agree that the Library shall make it available to borrowers under rules of the Library. Brief quotations from this document are allowable without special permission, provided that accurate acknowledgements of the source are made. Permission for extensive quotation from or reproduction of this document may be granted by my major professor. In [his/her] absence, by the Head of Interlibrary Services when, in the opinion of either, the proposed use of the material is for scholarly purposes. Any copying or use of the material in this document for financial gain shall not be allowed without my written permission.

Signature:

X *Katelyn McClure*

Date: 10/25/2022

“I COULD NOT UNDERSTAND ANYTHING THEY SAID!”: NON-NATIVE  
ENGLISH SPEAKING INSTRUCTORS, ONLINE LEARNING, AND STUDENT  
ANXIETY

BY

KATELYN LEE MCCLURE

Submitted to the Faculty of the Graduate School of  
Eastern Kentucky University  
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

December 2022

© Copyright by KATELYN LEE MCCLURE 2022  
All Rights Reserved.

## ABSTRACT

Non-native English speaking (NNES) instructors are often rated lower within course evaluations and are typically criticized for their accents (Rubin, 1992; Subtirelu, 2015). Reasonings behind this have not been researched much in terms of online education, though the relevance of this topic is continuing to grow through online learning. The current experiments aim to determine if the presence of an NNES accent causes more learning anxiety compared to an instructor with a standard American accent. Two experiments were conducted to gauge participants' anxiety level and learning performance. In both experiments, participants were given a set of four videos divided into two segments: one containing videos with an NNES instructor and the other containing videos with a standard American accented instructor. After each video, participants were asked recall questions over the information that they had just received before moving on to the next video. In between the two segments, participants' anxiety levels were measured. At the end of each experiment, participants were asked to fill out a Chinese language experience form and demographic information. Our findings indicated the instructor type influenced recall and anxiety.

## Table of Contents

<b>CHAPTER 1</b> .....	<b>1</b>
<b>Who is Considered A Non-Native English Speaker?</b> .....	<b>2</b>
<b>The Importance of An Instructor’s Voice in Online, Multimedia Learning</b> .....	<b>4</b>
<b>Test Anxiety as a Basis for Student Anxiety</b> .....	<b>13</b>
<b>Intergroup Communication Anxiety</b> .....	<b>16</b>
<b>Purpose of the Current Experiments</b> .....	<b>20</b>
<b>CHAPTER 2</b> .....	<b>23</b>
<b>Participants</b> .....	<b>23</b>
Experiment 1 .....	23
Experiment 2 .....	24
<b>Materials and Procedure</b> .....	<b>25</b>
<b>CHAPTER 3</b> .....	<b>31</b>
<b>Experiment 1</b> .....	<b>31</b>
<b>Experiment 2</b> .....	<b>36</b>
<b>CHAPTER 4</b> .....	<b>44</b>
<b>Participants’ Self-Reported Anxiety Levels</b> .....	<b>44</b>
<b>Participants’ Recall Performance</b> .....	<b>47</b>
<b>Limitations</b> .....	<b>51</b>

<b>Implications and Future Directions .....</b>	<b>52</b>
<i>References.....</i>	<i>55</i>
<i>Appendix A: Kimura’s Foreign Language Listening Anxiety Scale (2008).....</i>	<i>67</i>
<i>Appendix B: McGowan (2015a; 2015b) Based Chinese Language Experience and Attitude Scale .....</i>	<i>70</i>
<i>Appendix C: The Burns Anxiety Inventory (1999) .....</i>	<i>72</i>



## TABLE OF FIGURES

FIGURE	PAGE
Figure 1 - NES Instructor .....	27
Figure 2 - NNES Instructor .....	28
Figure 3 - Kimura Language Anxiety Scale (2008) Averages for Experiment 1.....	32
Figure 4 - Kimura Language Anxiety Scale (2008) Averages with Language Experience for Experiment 1 .....	33
Figure 5 - Total Recall Scores for Experiment 1 .....	34
Figure 6 - Total Recall with Language Experience for Experiment 1 .....	36
Figure 7 - Kimura Language Anxiety Scale (2008) Averages for Experiment 2.....	37
Figure 8 - Kimura Language Anxiety Scale (2008) Averages with Language Experience for Experiment 2.....	38
Figure 9 - Burns Anxiety Inventory (1999) Averages for Experiment 2 .....	39
Figure 10 - Burns Anxiety Inventory (1999) Averages with Language Experience.....	41
Figure 11 - Total Recall Scores for Experiment 2.....	42
Figure 12 - Total Recall with Language Experience for Experiment 2 .....	43

## CHAPTER 1

### INTRODUCTION

Course evaluations are an integral part of post-secondary education and give instructors feedback on their courses to improve their content and teaching practices. For non-native English-speaking (NNES) instructors, these evaluations may not accurately represent their efforts. NNES instructors often receive lower course evaluations and are criticized for their accents (Doubleday & Lee, 2016; Rubin, 1992; Sanchez & Khan, 2016; Subtirelu, 2015). Multiple factors could be the root cause of this issue, including stereotypes and biases. Another factor contributing to this phenomenon that is not actively researched is student anxiety. When a native English speaking (NES) student conversates with an NNES instructor, their level of student anxiety becomes naturally higher (Ahn, 2010; Hammer et al., 1998; Imamura et al., 2016; Stephan et al., 1999). A student's anxiety may stem from higher levels of cognitive load (Mayer et al., 2003; King & Finn, 2017; Sweller & Chandler, 1991; Sweller et al., 2019) and intergroup communication anxiety (Berger, 1979; Berger & Calabrese, 1975; Gudykunst, 1993; Stephan & Stephan, 1985; Stephan et al., 1999). When considering an online environment, this student anxiety may be increased even more due to the anxiety already brought about from the online environment (Tuncay & Uzunboylu, 2010). Therefore, we believe that these factors might combine to produce a high level of student anxiety through the lens of test anxiety, especially those who take online courses. The current experiments seek to investigate if NES students experience

higher test anxiety levels in an asynchronous online learning environment when taught by an NNES instructor. Two experiments were included in the current study. We compared students' self-reported test anxiety levels after being taught by an NES and an NNES instructor. We also compared students' retention of the information presented in the lecture by both the NES and NNES instructors.

### **Who is Considered A Non-Native English Speaker?**

A second language (L2) speaker is defined as an individual who has learned another language after thoroughly learning what can be considered their primary language, typically from age five to adulthood (Ortega, 2009). This definition serves only as a general overview for the premises of what an L2 learner is. As Ortega (2009) points out, it can sometimes be hard to determine which languages an individual knows as L2s, seeing as they may learn multiple languages simultaneously due to growing up in multicultural environments. The numerous language acquisition makes it hard to determine which language was thoroughly learned before another. Despite these complexities, our current experiments have defined an L2 (NNES) instructor as an individual that has learned to speak English after age 10.

When individuals think of L2 English speakers, they typically imagine individuals with an accent, but that is not always the case. There is much talk and research in psychology about critical and sensitive periods for learning, especially language learning. A critical acquisition period has a set opening and closing age for language learning (McCarthy et al., 2018). This analogy means that, for our purposes, there is a time when an individual can begin to learn a new language and a time where they can no longer learn a new language without speaking with an accent. A critical

period has been highly supported for learning a first language, but it has not been as evident for L2 acquisition (Hakuta et al., 2003; Hartshorne et al., 2018). A definitive age when an L2 learner can learn a new language without an accent is yet to be determined. Researchers, however, have proposed an approximate age range.

Hartshorne et al. (2018) propose that the critical period of learning a new language is between eight and ten years old. Children who learn a second language before ages eight to ten can speak the L2 language without an accent (Hartshorne et al., 2018; Ortega, 2009). There are many reasons why accents appear after this critical period.

Accents can appear due to the standard form that each language is described as having. Each language, including English, has its own rules and regulations for the “proper/standard” way to write and speak (Snell & Andrews, 2016). These rules and regulations are extensive and are typically not efficiently used and followed during free-flowing dialogue (Snell & Andrews, 2016). Therefore, it would be easy for an L2 learner to become confused with pronunciations, especially if their primary way of learning English is through reading and writing instead of conversations (Horst et al., 1998). Horst et al. (1998) noted that L2 learners benefit from learning English by reading, but this can also pose issues with speaking. Pronunciation and spelling inconsistencies within the English language occur, and the spelling of a word is not always how the word is pronounced. For example, words such as read [reed], lead [leed], read [red], and lead [led] have similar spelling but have different pronunciations depending on the context. For an L2 learner, this can lead to confusion when speaking because they may pronounce these words the same way if pronunciation guides like the ones above are not provided.

Accented English may also stem from the fact that many languages have different sounds than English, and it may be difficult for an NNES to learn a new English pronunciation (Briner, 2021). As Briner (2021) points out, some sounds do not exist in specific languages, and the same vowels may have different pronunciations. Our experiments focus on Chinese accented English, and many sounds exist in English that do not exist in the Chinese language. An example is the sound of “th” in English. This sound does not exist in Chinese, and native Chinese speakers learning English tend to turn the “th” sound into an “s” sound instead (Zhang & Yin, 2009). This change in sound can make it hard for a native speaker to understand what the non-native speaker is saying if, for example, the NNES is attempting to say “this,” but it comes out as “sis,” a standard shortened version for the word “sister,” instead. Therefore, when exposed to these sounds after that initial critical period for L2 learning, it may be hard for individuals to learn these new sounds and modify existing ones (Rahman & Hasan, 2019; Zhang & Yin, 2009).

For our experiments, we consider an NNES instructor as someone who has learned the English language after the critical period of 10 years of age, meaning that the instructor has acquired an accent-English speech that was different from an American English accent that is common to the region where the experiments are being conducted.

### **The Importance of An Instructor’s Voice in Online, Multimedia Learning**

Mayer (2018) defined online learning as using a digital environment to deliver and support educational instruction. It is further clarified as having the consistent use of words and other media to deliver information (multimedia learning) on

a technological device, such as a computer or tablet, to change the learner's knowledge (Mayer, 2018). Therefore, we define online learning as learning that intends to change a student's knowledge level in an electronic environment using a multimedia learning basis.

The multimedia, online learning environment provides its own set of difficulties that contributes to students' anxiety. Abdous (2019) found an inverse relationship between students' anxiety and their learning effectiveness in online education. This finding indicates that students' anxiety level was inversely related to their effectiveness in learning the information presented in an online learning environment. Effectiveness skills in online learning include time management, critical thinking skills, and collaborating with others (Abdous, 2019). If students' anxiety is high, they cannot correctly employ these skills to enhance their learning which can directly affect their learning and transfer of information. This online anxiety only adds to the anxiety they are already experiencing from having an NNES instructor, further inhibiting their ability to learn and retain information.

Not only does this inverse relationship exist, but it has also been found that students experience anxiety days before online classes start, which inhibits standard thought processing (Tuncay & Uzunboylua, 2010). If this blockage persists, it results in students taking a more passive approach to learning the information presented, leading to an improper encoding of the information (Tuncay & Uzunboyula, 2010). This issue is an important one seeing as many as 25.3% of 1,377 students have been previously shown to experience this type of "first week of classes" anxiety when it comes to taking online classes, especially if they are first-time online students (Saadé et al., 2017).

Voice plays an integral part in the learning environment (Carpenter & Mueller, 2013; Carpenter & Mickes, 2016; Mayer et al., 2003), especially when it comes to multimedia learning which is typical for online learning (Mayer, 2009; 2018). As Mayer (2009) described, multimedia learning uses words and pictures to promote better learning and is commonly used in online education. An instructor typically employs media to facilitate students' learning in an online setting, such as animations, recorded lecture videos, or pictures. Multimedia learning has become a commonplace method of delivering information in online environments. It keeps a learner's attention better and allows advanced technologies to better deliver information in imagery formats (Mayer, 2009; 2018). Multimedia learning instruction has continuously grown over the past 30 years and has enhanced students' learning in a person-centered rather than a technology-centered approach (Mayer, 2018). This person-centered approach means that the instructor does not allow the technology to become the centerpiece of delivering information; instead, the instructor is still actively engaging with their students alongside the media aspect. This approach is where the importance of the instructor's voice comes in.

Mayer et al. (2003) described an instructor's voice as more than an agent of information transport. An instructor's voice gives us information on how suitable an individual is as a conversation partner (Doubleday & Lee, 2016; Rubin, 1992; Sanchez & Khan, 2016; Subtirelu, 2015). This information can demonstrate how effective an instructor can be at relaying and explaining information to their students. Bronstein and Ogilvie (1952) found that when school board professionals interviewed candidates for teaching positions, a candidate's voice was the primary consideration. When asked

about a candidate's voice, these professionals stated that they were looking for those they considered to speak "good" English (Bronstein & Ogilvie, 1952). The school board professionals in the study considered "good" English as having a similar regional accent (i.e., the candidate is from the school's same state or the local area, so they have the same vernacular). Candidates with "good" English would allow the children to "fully understand them" (Bronstein & Ogilvie, 1952). Candidates would not receive further consideration for positions if they did not achieve a "satisfactory" voice level (Bronstein & Ogilvie, 1952).

The importance of voice has only increased as the years have gone by, especially with the increased prevalence of online education. Servilha and de Costa (2015) surveyed university professors about using their voices in their learning environments to determine how they perceived the importance of their voices. They found that professors rated their voices as integral tools that were the main reason students successfully achieved high grades and learned the information presented in the classes (Servilha & de Costa, 2015). These examples only begin to show the importance of voice quality in online education.

Another factor that should be considered when discussing the importance of an instructor's voice in online multimedia education is fluency (Carpenter et al., 2013; 2016; Serra & Magreehan, 2016; Sanchez & Khan, 2016). Fluency is defined as the perception of a learner on how easily the learner could take in the information (Carpenter et al., 2013; 2016; Serra & Magreehan, 2016; Sanchez & Khan, 2016). In an educational setting, this applies to how fluent an instructor speaks. In other words, if an instructor can conduct a lecture in a concise, clear, and quick manner without stuttering



over words or over-using filler words, such as “uh” and “um,” the instructor is considered “fluent” (Carpenter et al., 2013; 2016; Serra & Magreehan, 2016). This fluency has been identified as an essential aspect of students’ perception of their education progress, how well they feel they can learn, and how they view their instructor (Carpenter et al., 2013; 2016; Serra & Magreehan, 2016; Sanchez & Khan, 2016). When instructor fluency is perceived as low, as is typical with NNES instructors, students may feel that they cannot adequately acquire information that is presented (Carpenter et al., 2013; 2016; Serra & Magreehan, 2016; Sanchez & Khan, 2016). This low fluency perception can lead students to interpret their NNES instructors as less capable of teaching the information than their NES counterparts (Carpenter et al., 2013; 2016; Serra & Magreehan, 2016; Sanchez & Khan, 2016).

This idea of fluency has been researched through similar but different aspects. Mayer et al. (2003) proposed that the importance of an instructor’s voice is due to social agency. They defined social agency as using a speaker’s voice in multimedia learning to influence processes and outcomes of learning via social cues (Mayer et al., 2003). The general premise of the Social Agency Theory is that the instructor’s voice activates a social cognitive schema; when this schema is activated, learners will act as if they are in a conversation with another person. When a learner behaves as though he or she is in a conversational situation, the learner is more likely to process the information as a bi-directional social communication (conversation) rather than a uni-directional information-gathering process. This social communication dynamic brings the social rules of conversation into play, meaning that students will try harder to make sense of the information being presented by engaging in deep cognitive processing (Alyahya,

2021; Mayer et al., 2003; Wang et al., 2017). These deep cognitive processes stem from the learner identifying the instructor as an intelligent agent engaging the learner in a conversation rather than only talking at the learner to share the information (Mayer et al., 2003).

Atkinson et al. (2005) tested Social Agency Theory by comparing college and high school students' performance on transfer tests, which is defined as a learner's ability to use previous experience on a newly learned skill. Both experiments had the students complete a computer-based mathematics lesson with an animated parrot guide who spoke with either a standard Midwestern American accented voice or a female computer-synthesized voice. The researchers found that the human voice fostered a better and deeper understanding of the presented material for college and high school students than the machine-synthesized voice. (Atkinson et al., 2005). Students also rated the human voice as more attractive than the machine-synthesized voice (Atkinson et al., 2005). Though this study does not focus on accent comparison, it shows that using a voice the learner is not familiar with affects learning and attitudes. This study displays a more extreme voice difference than one identified between accents but still provides valuable information about the importance of an instructor's voice in learning. These findings are consistent with the original findings of the Mayer et al. (2003) study, which compared the standard Midwestern American accented voice to a machine-synthesized voice and included a Russian accented voice while using an animation alongside the voices. Mayer and colleagues (2013) found that both the machine-synthesized voice and the Russian-accented voice paired with an animated agent resulted in worse transfer performance than the Midwestern American-accented human voice, and both were

deemed less attractive than the standard voice (Mayer et al., 2003). These two studies show how important voice is in the learning environment. Students are more likely to properly take in information and rate the speaker as a more attractive conversational partner when it is a voice that they are familiar with. If the voice that accompanies the multimedia is not one that students are familiar with or can easily understand, they will not correctly retain and transfer the information presented.

### **Cognitive Load, Accented English, and Student Anxiety**

A vital voice factor that NNES instructors unintentionally bring is the idea of cognitive load. Cognitive load is defined as the fact that human cognition is limited by the number of information elements our brain can process in working memory at one time (Paas et al., 2010; Sweller, 1994; Sweller, 2010; Sweller & Chandler, 1991). This load is increased when individuals experience unnecessary demands on their cognitive system and can impair learning and knowledge transfer if the cognitive load demand becomes too high (Sweller et al., 2019). This overload of cognitive processing often occurs when an individual converses with another person who has an unfamiliar accent (Grey et al., 2019; Mayer et al., 2003, Morris & Chen, 2020; 2021). Cognitive load and multimedia learning theories state that processing accented speech would take up cognitive resources, meaning learners would have less working memory for learning (Paas et al., 2010; Sweller, 1994; Sweller, 2010; Sweller & Chandler, 1991; Sweller et al., 2019).

The notion of accented voice increasing cognitive load has both neuroscience and behavioral data support. In terms of neuroscience findings, Grey et al. (2019) studied event-related potentials (ERPs) concerning accented sentence comprehension.

Participants listened to various sentences in either a standard Midwestern American accent or Chinese-accented English with either a face displayed along with the sentences or no face displayed. They recorded the ERPs using an electrode-mounted elastic cap that recorded from the front, back, and center parts of the scalp. These recordings found that more brain areas are activated when an individual listens to an NNES individual than an NES individual, especially when grammatical errors are part of the spoken sentence (Grey et al., 2019). Findings from this study indicated that different use of brain regions for processing accented sentences could impede the listener's ability to retrieve and encode the presented information (Grey et al., 2019). These results provide neurological support for the notion that cognitive load increases when listening to an NNES instructor. This increase in cognitive load can inhibit a learner's transference and retention in an online learning environment.

The notion that NNES speech induces a more significant cognitive load also has behavioral data support. Multiple studies have researched cognitive load's effects of voice differences on students' performance (Mayer et al., 2003, Morris & Chen, 2020; 2021). Cognitive load was studied through the view that students needed to allocate as little cognitive resources as possible to process their instructor's voice so that they could better focus on learning the presented material. Results from these studies indicated that students performed better on transfer tests when their instructor had a standard Midwestern American accent than if the instructor had a foreign accent or was a machine-synthesized voice (Mayer et al., 2003; Morris & Chen, 2020; 2021). These results show that students in the accented and machine-synthesized voice condition had to allocate more cognitive processing to understand the instructor than to understand the

material (Mayer et al., 2003; Morris & Chen, 2020; 2021). When cognitive load is lower while listening to an NES instructor, NES students can focus their cognitive efforts on learning the material and how to transfer it to other situations. Students rate familiar voices as being less effortful to process than ones that they are not (Morris & Chen, 2020; 2021), indicating that this may be one reason why students do perform better when listening to a familiar accent.

This uneven allocation can also be described as deriving from an impairment in switching between cognitive processes due to cognitive overload (King & Finn, 2017). When in cognitive overload, an individual's ability to efficiently switch between the different components of working memory is significantly decreased (King & Finn, 2017). This decrease in working memory performance increases anxiety which can be directly related to poorer performances on transfer assessments, a test of the ability to use previous experience on a newly learned skill (Ahn, 2010; Mayer et al., 2003). When applied to an educational environment, these factors combine to impede students' learning significantly (Broadbent & Fuller-Tszkiewicz, 2018; Mayer, 2017; 2018). This impediment is especially prominent in an online environment. In these environments, concentration and accessibility to most of their working memory and fluency of switching between the aspects of it are vital to ensuring that students will retain and adequately transfer the information presented (Broadbent & Fuller-Tszkiewicz, 2018; Mayer, 2017; Mayer, 2018).

Feng et al. (2021) found that when an individual experience cognitive overload, they also experience difficulties with language perception. The cognitive overload inhibits their ability to identify pitch shifts, tone identification, and word discrimination

(Feng et al., 2021). If students cannot comprehend whether the NNES instructor is asking a question or making a statement, it could lead to confusion, stress, and higher anxiety levels. Overall, the increased cognitive load leads to fewer resources for learning, significantly higher levels of anxiety, and lower achievement in a multimedia, online learning environment.

### **Test Anxiety as a Basis for Student Anxiety**

Cognitive load plays another central part in the learning process through cognitive interference. Cognitive interference refers to the disruption to an individual's cognitive activity due to anxiety and self-centered thinking (Comunian, 1993; Kurosawa & Harackiewicz, 1995; Sarason, 1984), which provides one of two bases for the idea of test anxiety (Comunian, 1993; Sarason, 1984; Sarason et al., 1990).

Testing is a central aspect of education from the time an individual enters the school system until they complete it to their satisfaction. Hart et al. (2015) found that during the 2014-15 school year, students between the grades of pre-K to 12 were required to take an average of 112.3 tests. This statistic meant that an average student took approximately eight tests for the year in the 66 school districts in the study (Hart et al., 2015). This report did not include any tests or test preparations required by the schools or the teachers within the schools either, so it would be fair to assume that the students took more tests than what was reported. When looking at post-secondary education, it is well known that testing is even more vital than in primary education, especially during midterms and finals when students experience significant amounts of stress.

Test anxiety has been defined as a multicomponent phenomenon with two psychological sources: worry and emotionality (Comunian, 1993; Sarason, 1984; Sarason et al., 1990). Worry is an individual's conscious concern about their performance on the test, while emotionality is the arousal response to the test that is causing stress (Comunian, 1993; Sarason, 1984; Sarason et al., 1990). Both factors result in the test-taker being more focused on the self than the task at hand, leading to distracting thought patterns (Comunian, 1993; Kurosawa & Harackiewicz, 1995; Sarason, 1984). These distracting thought patterns typically lead to the poor performance that the student is expecting and, in turn, reinforce the anxiety and cause the student to continually experience these feelings for each test taken afterward (Comunian, 1993; Kurosawa & Harackiewicz, 1995; Sarason, 1984). Therefore, we can say that a primary source of student anxiety is derived from testing, specifically the fear of failure, which contains multiple factors that are known as cognitive interference (Arkin et al., 1982; Comunian, 1993; Kurosawa & Harackiewicz, 1995; Sarason, 1984; Sarason & Sarason, 1981; Sarason & Sarason, 1987).

When cognitive interference occurs, the individual struggles to retrieve the essential information for the test they are taking, leading to negative consequences (Arkin et al., 1982; Comunian, 1993; Kurosawa & Harackiewicz, 1995; Sarason, 1984; Sarason & Sarason, 1981; Sarason & Sarason, 1987). These consequences include enhancing the amount of anxiety they feel when presented with another test (Arkin et al., 1982; Comunian, 1993; Sarason, 1984), thus leading the student to be more focused on external factors rather than the task at hand (Arkin et al., 1982; Kurosawa & Harackiewicz, 1995; Sarason, 1984; Sarason & Sarason, 1987).

The enhanced anxiety stems from the previous failure that students have experienced on other tests (Comunian, 1993; Sarason, 1984). As stated previously, students form ideas and beliefs about how they will perform based on what they feel about their ability to acquire and recall information (Carpenter & Mueller, 2013; Carpenter & Mickes, 2016; Serra & Magreehan, 2016; Sanchez & Khan, 2016). If students begin a test with low expectations and find out that they achieved those expectations or went below the expectations, it can increase their anxiety (Comunian, 1993; Sarason, 1984). When the knowledge of another test is known, it can increase their anxiety both while learning the information that will be on the test and during the test (Comunian, 1993; Sarason, 1984).

This increased anxiety that stems from cognitive interference instills a “call for action” into the individual, making them want to change the stress they are experiencing in their current situation (Sarason & Sarason, 1981; Sarason & Sarason, 1987). When they are unable to do something about this call, the anxiety becomes more prominent, leading to more self-centered thoughts and external distractors that hinder performance and focus to a degree that the individual may be unable to focus on the test at all (Arkin et al., 1982; Kurosawa & Harackiewicz, 1995; Sarason, 1984; Sarason & Sarason, 1987). The student starts forming outward thoughts about themselves and how they are being perceived in the situation rather than recalling the information needed (Arkin et al., 1982; Kurosawa & Harackiewicz, 1995; Sarason, 1984; Sarason & Sarason, 1987). Students begin to feel different emotions along with these thoughts, especially when already experiencing high anxiety, such as disgust and shame (Arkin et al., 1982). When the students are experiencing emotions along with the initial distracting thoughts,



they become even more detached from the situation at hand, causing an even more significant cognitive interference and inability to recall information (Arkin et al., 1982; Kurosawa & Harackiewicz, 1995).

Personal salience, a product of personality that shapes how people view the self and the world, is one factor that plays a part in whether a student experiences test anxiety (Sarason, 1984). This factor shows that when some individuals are under evaluation, they are more likely to experience stress and anxiety because they view this evaluation as a threat to their wellbeing (Kurosawa & Harackiewicz, 1995; Sarason, 1984). In an educational setting, a test can be seen as a threat to their grades, status within the class, relationships, and more. These threats and worries are where the distracting thought patterns commonly viewed in those with test anxiety come into play through self-focused thinking instead of task-focused thinking (Kurosawa & Harackiewicz, 1995). The individual that focuses on self-evaluative and self-deprecatory thinking causes cognitive interference and hinders the learning process (Comunian, 1993; Deffenbacher, 1980; Kurosawa & Harackiewicz, 1995; Morris et al., 1981; Sarason, 1984; Sarason et al., 1986).

### **Intergroup Communication Anxiety**

Previously it has been found that NES students will sometimes actively avoid taking a course taught by an NNES instructor because they feel that it takes too much effort to understand the instructor and complete the coursework (Subtirelu, 2015). These feelings may stem from what is known as intergroup communication anxiety. Intergroup communication anxiety (ICA) is defined as when two individuals from separate groups interact and experience feelings about different concerns (Gudykunst,

1993; Hammer et al., 1998; Montgomery & Zhang, 2018; Stephan & Stephan, 1985; Stephan et al., 1999; Turner et al., 2007; Turner et al., 2008; Turner et al., 2015). The individual in the dominant culture, the NES group in the current experiments, might fear that the power and control they have by being in the ingroup is threatened (Gudykunst, 1993; Hammer et al., 1998; Montgomery & Zhang, 2018; Stephan & Stephan, 1985; Stephan et al., 1999; Turner et al., 2007; Turner et al., 2008; Turner et al., 2015). The out-group individual, the NNES group, fears that they will be stereotyped or not accepted into the dominant ingroup culture (Gudykunst, 1993; Hammer et al., 1998; Montgomery & Zhang, 2018; Stephan & Stephan, 1985; Stephan et al., 1999). When applied to an educational setting, NES students may be fearful of not having control over their grades and the outcomes of the course. This type of ICA is our focus. In our current experiments, NES students may experience anxiety over their perceived inability to control the outcomes in their course due to improper acquisition of information presented by the NNES instructor.

Imamura et al. (2016) conducted a study focusing on Americans' views of interactions with Chinese-accented individuals. After filling out demographic information, participants were asked about their familiarity with Chinese culture, language, and anxiety concerning interactions with Chinese-accented English speakers. Participants were then asked to list whom they most frequently interacted with that spoke Chinese-accented English and describe them. Multiple scales were given to participants to assess attitudes towards the Chinese-accented speaker, how much anxiety they experienced when communicating with them, perceived English proficiency, and attitudinal factors. When the participants rated the accented speaker's

English as lower proficiency, participants also felt more anxiety at both the group and at the individual level. The results of this study may be based on inferences that the American participants (73.8% White, 6.3% African American, 9.7% Hispanic, and 6.8% Asian America) made about the amount of effort needed to communicate with the Chinese-accented speaker (Imamura et al., 2016).

This effortful inference can be directly related to cognitive load, as we discussed earlier (Paas et al., 2010; Sweller, 1994; Sweller, 2010; Sweller & Chandler, 1991).

When an NES individual communicates with an NNES individual, they feel the increased need to concentrate on making sure that they understand the NNES individual clearly (Mayer et al., 2003). Therefore, when an NES individual discovers that another individual is an NNES, they automatically become aware that they would need to be more mentally dedicated to the conversation than they usually would be (Brown et al., 1973; Imamura et al., 2011; Imamura et al., 2016; Montgomery & Zhang, 2018). This knowledge and awareness of mental effort needed could lead to active avoidance of conversation with or, for students, taking a class taught by an NNES individual. Students do this because they want to avoid the feeling of cognitive overload which brings about anxiety (Brown et al., 1973; Imamura et al., 2011; Imamura et al., 2016; Montgomery & Zhang, 2018).

It is possible that this assumption of more effort also stems from social attractiveness (Montgomery & Zhang, 2018). An individual's likability is based on written or verbal statements from others and how highly rated they are (Brown et al., 1973). The less accented an NNES individual has, the more likely an NES individual is to identify the person as a competent and inclusive communication partner

(Montgomery & Zhang, 2018). In an educational setting, this means that an NES student would possibly be more willing to take classes held by an NNES instructor if they perceive their accent not to be strong, meaning that they find that type of NNES instructor more competent at teaching. This idea, again, can be directly related to cognitive load. The less cognitive load a student is experiencing, the more comfortable the student perceives the situation to be (Imamura et al., 2011; Imamura et al., 2016) and finds their instructor more socially attractive (Brown et al., 1973; Imamura et al., 2011; Imamura et al., 2016; Montgomery & Zhang, 2018). In turn, students feel they can get as much out of their education as possible (Carpenter et al., 2013; 2016; Serra & Magrehan, 2016; Sanchez & Khan, 2016).

This point of language perception being a cornerstone of ICA is further illustrated by the findings by Imamura et al. (2011) that when an individual interprets a speaker as speaking in their native language competently, psychological closeness and intimacy are triggered. When this process is broken up by high amounts of anxiety and cognitive load, it can be more challenging for a listener or a learner to fully comprehend what is being said or taught (Imamura et al., 2011). In a culture like that of the United States of America, where language is highly valued, this breaking of language and extra cognitive processing only dissuades native English speakers from attempting to communicate (Imamura et al., 2011). This language break informs native English speakers that it will be harder to communicate with the accented speaker, furthering the psychological distance experienced (Imamura et al., 2012; Imamura et al., 2016). This distancing interacts with the extra cognitive effort students assume they will need to understand the instructor to increase the cognitive demand further and, in turn, increase

the amount of anxiety they feel (Imamura et al., 2011; Imamura et al., 2016; Morris & Chen, 2020; 2021 Paas et al., 2010; Sweller, 1994; Sweller, 2010; Sweller & Chandler, 1991).

The psychological distancing between NES and NNES may also explain why NES students may feel uncomfortable approaching their NNES instructor due to this anxiety (Turner et al., 2007; Turner et al., 2008; Turner et al., 2015). It has been previously shown that the more intergroup anxiety an individual is experiencing, the less likely they are to approach someone outside of their group (Turner et al., 2007; Turner et al., 2008; Turner et al., 2015). Therefore, it is possible that an NES student could be experiencing trouble with the material presented in the course but is too uncomfortable in approaching the NNES instructor to receive assistance in learning the material due to the anxiety and distance that they feel (Imamura et al., 2011; Imamura et al., 2012; Imamura et al., 2016; Turner et al., 2007; Turner et al., 2008; Turner et al., 2015).

### **Purpose of the Current Experiments**

Students' significant anxiety can cause many issues within an online learning environment. Our experiments focus on the test anxiety that NES students feel and how it may affect their ability to perform well in online courses taught by NNES instructors. It is possible that NES students feel that they are unable to successfully acquire and encode information that they will be tested on later. They experience this feeling due to the need to allocate more of their cognitive resources to properly communicate with and understand the NNES instructor (Imamura et al., 2011; Imamura et al., 2016; Paas et al., 2010). Students may be inclined to leave negative course evaluations when

experiencing these feelings and possibly poor test performance. Students could also go on websites, such as [ratemyprofessor.com](http://ratemyprofessor.com), to share their experiences and beliefs about why they failed in their course, which could lead other students to avoid taking courses taught by NNES instructors for fear of having the same or similar experiences as previous students. If NES students and NNES instructors are made aware of the underlying effects of anxiety on students' performance, steps can be taken to avoid these discourses and misinterpretations.

Though many studies have focused on anxiety related to in-person, voice-only, and interpersonal situations in educational settings, none have focused on pre-recorded online lecture videos. This previously unstudied area is what our experiments aim to explore. We believe that pre-recorded online lecture videos provide an even more apt possibility of causing anxiety because NES students may feel even more disconnected from the NNES instructors because there is no time when they are actively engaging with the professor. Instead, the students rely on pre-recorded information where they would have to reach out directly to the instructor for clarification rather than having the ability to ask for it as they are receiving the information. With all the information that we have already looked at, specifically cognitive load (Mayer et al., 2003; King & Finn, 2017; Sweller & Chandler, 1991; Sweller et al., 2019) and psychological distancing (Imamura et al., 2011; 2012; 2016; Turner et al., 2007; 2008; 2015), these extra steps and barriers that NES students experience with pre-recorded online lecture videos could lead to an even more significant amount of anxiety than what is experienced in other situations.

Our experiments compare the difference in student anxiety and recall between an NES and NNES instructor via pre-recorded online lecture videos. We aim to see if heightening anxiety levels are present for students when they have an NNES instructor rather than an NES instructor. We also aim to see if there is a difference between the students for each instructor on recall either as a product of the anxiety or the instructor difference alone. We hypothesize that a.) students will experience higher anxiety levels and b.) poorer memory recall with the NNES instructor than the NES instructor.

## CHAPTER 2

### METHOD

#### **Participants**

We assumed a conservative effect size of .3 at 80% power. A priori power analysis was completed in GPower (Faul et al., 2007) and the estimated sample size was 71. The current study had 69 participants in Experiment 1 and 104 participants in Experiment 2 who had successfully completed the survey.

#### ***Experiment 1***

For the first experiment, the ages of the participants ranged from 18 to 23 ( $M=18.9$ ,  $SD=1.25$ ), with most participants being female (19 Males and 50 Females). Most participants identified their ethnicity as White ( $n=62$ ). There were also African Americans ( $n=3$ ), Hispanic or Latinos ( $n=2$ ), and mixed-race ( $n=2$ ). Participants were asked what languages they speak at home, with 67 indicating that they only spoke English at home and two others indicating that they speak English and one other language. All participants indicated that they spoke English as their first language. Fifteen participants stated that they spoke one or two additional languages at a conversational level or better.

Participants were all college students recruited from the psychology subject pool at a large state university. All participants, except four, indicated that they had lived in either Kentucky, North Carolina, Illinois, or Ohio for most of their lives. Four participants did not report a specific state of residence, only either United States or



counties with no state listed. Most participants stated that they had watched online lecture videos 2-3 times a week over the past year ( $n=32$ ). Five stated that they watched no online lecture videos in the past year, three once a year, ten once a month, 11 once a week, seven 4-6 times a week, and one daily. Most participants said they had taken 1-5 online classes with multiple lecture videos ( $n=42$ ). Nine said they had taken no online classes with multiple lecture videos, 13 had taken 6-10, and three had taken 11-15. Two participants indicated that they had been diagnosed with hearing difficulties.

### ***Experiment 2***

For the second experiment, the ages of the participants ranged from 17 to 53 ( $M=21.3$ ,  $SD=6.81$ ), with most participants being female (16 Males, 83 Females, 4 non-disclosures, and 1 Other). Most participants identified their ethnicity as White ( $n=85$ ). There were also African Americans ( $n=6$ ), Hispanic or Latinos ( $n=5$ ), Asians ( $n=5$ ), and mixed-race ( $n=3$ ). Participants were asked what languages they speak at home, with 99 indicating that they only spoke English at home, four indicating that they only spoke Spanish, and one other indicating that they speak English and one other language. Most participants indicated that they spoke English as their first language ( $n=101$ ). Thirty-one participants stated that they spoke one or two additional languages at a conversational level or better.

Participants were all college students recruited from the psychology subject pool at a large state university. All participants, except five, indicated that they had lived in either Kentucky, Texas, Tennessee, California, Washington, Indiana, New Jersey, Illinois, Florida, Alaska, Georgia, or Ohio for most of their lives. Three participants did not report a specific state of residence, only United States. One participant indicated

that they had lived in Mexico, and another indicated that they had lived in Australia for most of their lives. Most participants stated that they had watched online lecture videos 2-3 times a week over the past year ( $n=36$ ). Ten stated that they watched no online lecture videos in the past year, eight once a year, 17 once a month, 20 once a week, nine 4-6 times a week, and four daily. Most participants said they had taken 1-5 online classes with multiple lecture videos ( $n=50$ ). Eight said they had taken no online classes with multiple lecture videos, 29 had taken 6-10, 13 had taken 11-15, one had taken 16-20, two had taken 20+, and one had taken the number of classes to equal multiple degrees. Four participants indicated that they had been diagnosed with hearing difficulties.

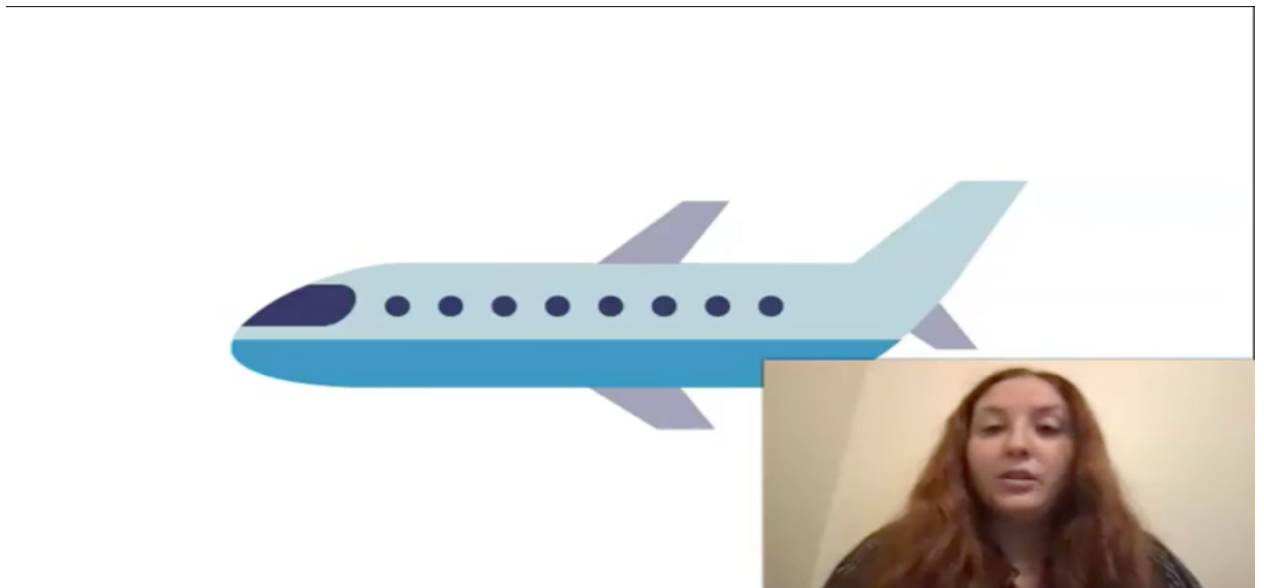
### **Materials and Procedure**

The current experiments' materials were adapted from previous studies (Chen & Lorch, 2018; Chen & Thomas, 2020). The experiments were conducted in a laboratory setting. The experiment materials were hosted on Qualtrics, an online survey platform. The materials were delivered on Dell desktop computers that used the Windows processing system. The monitors were 22 inches in size, which is an average size of a desktop monitor. Participants wore standard over-ear headphones to prevent noise from disturbing each other as the computers were side-by-side, and participants were run in groups of up to three. Participants took part in the experiments within an hour time block in a laboratory setting on campus that housed three computers. The Qualtrics system used the random assignment logic based in the Qualtrics system to randomly assign participants to one of two video lecture conditions: one that began with an NNES instructor and the other that started with an NES instructor.

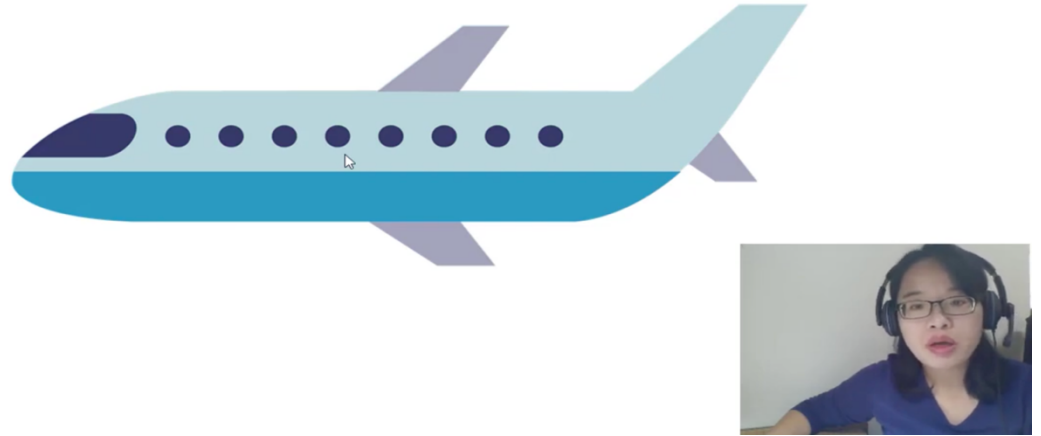
The experiments began with participants reading and signing a physical informed consent form. Participants were then given a set of instructions to read and asked by an experimenter if they had any questions before moving on to the experiment. After these steps, participants were directed to put on the headphones and were given a short questionnaire assessing their level of knowledge about airplanes and how they achieve flight. This questionnaire asked participants to indicate how much time they feel they listen to or read media about airplanes and asked them to identify parts of a plane and the physical forces that enable airplane flight. Participants were then shown a sample video lecture and questions like those they would answer later. The sample video presented information related to fire trucks, and the sample video instructor was different from both the NES and NNES instructor for the main lecture videos. This served to acclimate participants to the type of instruction they would be receiving and the questions they would be asked.

After the instructional phase, participants were randomly assigned to one of two experimental conditions. Each condition showed both the NES and NNES instructors with the order in which they were viewed as counterbalanced between the groups. Each lecture video contained a set script that both instructors read from and displayed a PowerPoint presentation depicting static drawings that the instructors scrolled through while presenting the lesson (see Figures 1 and 2). Instructors' faces appeared in a small window in the bottom right corner of the PowerPoint. The purpose of presenting the instructors' faces is to provide participants with concrete knowledge of the instructor's ethnicity. The NES instructor had a standard southern American accent native to the area in which the experiments were conducted. The NNES instructor was a Chinese-

accented speaker who learned English at 12 years of age and had a noticeable and comprehensible accent. The first condition of the experiments contained the NES instructor for the first two lecture videos and the NNES instructor for the last two lecture videos. The second condition of the experiments contained the NNES instructor for the first two lecture videos and the NES instructor for the last two lecture videos. The videos covered four different forces of flight in a set order: a.) weight, b.) drag, c.) thrust, and d.) lift.



**Figure 1 - NES Instructor**



**Figure 2 - NNES Instructor**

After each lecture video, participants were asked questions about the videos' critical concepts. They were first presented with two open recall questions asking them to identify the force discussed and its concept. The PI and six undergraduate research assistants scored all open recall questions. Interrater reliability was calculated before open recall scoring was completed and showed to be 96%. After the open recall, they were given three multiple-choice questions with four options, and the Qualtrics system automatically scored these.

After the second and fourth lecture videos, participants were asked to fill out a modified version of Kimura's Foreign Language Listening Anxiety scale (2008). This scale contained 20 questions to assess how much anxiety participants felt while listening to the instructor (see Appendix A). Participants rated their agreement to each statement presented on a five-point Likert scale ranging from "Strongly Agree" (5) to "Strongly Disagree" (1), with higher scores indicating higher levels of anxiety. This

scale assessed the level of anxiety participants felt while learning information concerning aeronautical engineering from each instructor.

After completing the anxiety scale the second time, participants filled out a questionnaire about their familiarity and attitudes towards Chinese accents (McGowan 2015a; 2015b; see Appendix B). This questionnaire was used to divide participants into two groups based on accent familiarity, as it is possible for a student to be familiar with an instructor's accent due to instances in their personal life. This familiarity could decrease a student's cognitive load levels and lead to better performance than expected from the evidence found. Participants were asked their level of agreement to each of the statements using a five-point Likert scale ranging from "Strongly Agree" (5) to "Strongly Disagree" (1). The higher the score participants received, the more familiar they were with Chinese-accented English. We used this scale to divided participants into those with high experience listening to Chinese-accented English and those with low experience in this domain.

Finally, participants were asked to fill out demographic information. Participants were asked their gender, age, ethnicity, the county and state they have lived in most of their life, language spoken at home, the highest level of education, and if English is their first language. Participants were also asked how many other languages besides English they speak at a conversational level or better, if they have been diagnosed with any hearing difficulties, how often they watch online lecture videos, and how many online classes they have taken.

The methodology for Experiment 2 was the same as Experiment 1, with the addition of a shortened version of the Burns Anxiety Inventory (1999; see Appendix C) after each set of recall questions for each lecture video.

## CHAPTER 3

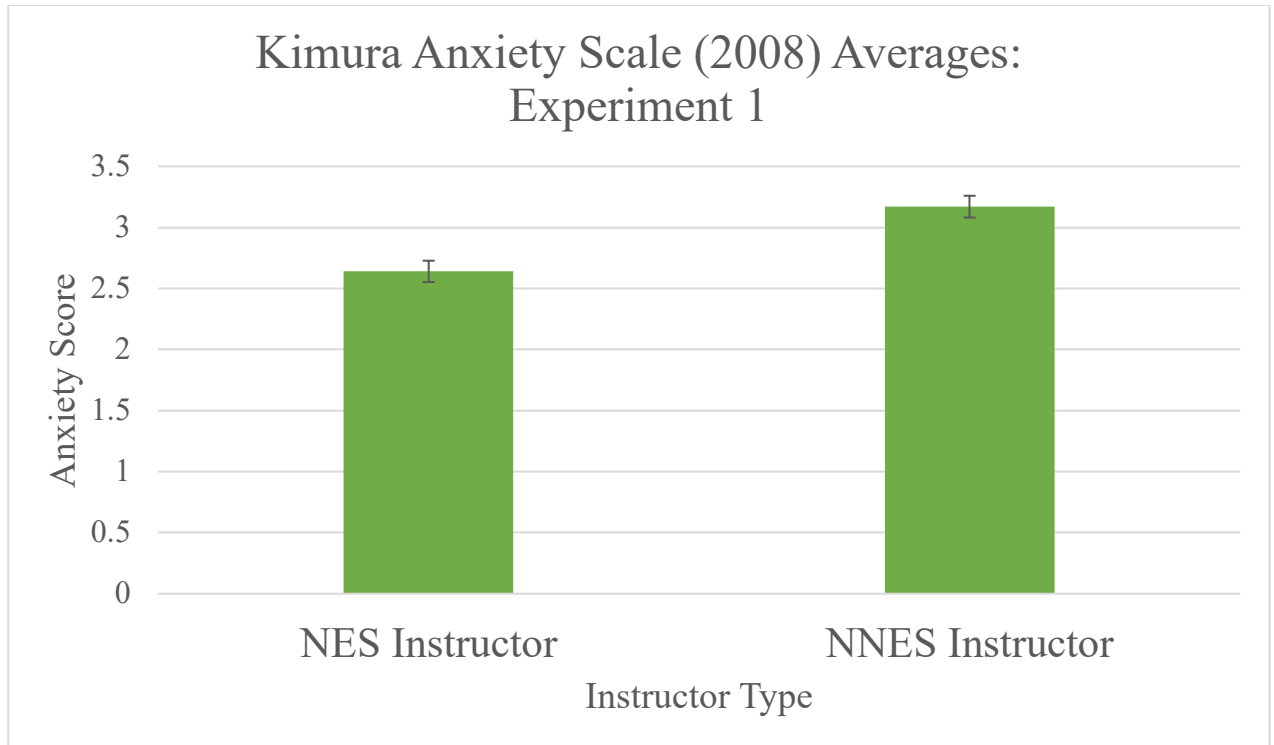
### RESULTS

#### **Experiment 1**

We conducted a repeated-measures ANOVA to analyze participants' self-reported anxiety levels for both experiments' Kimura's Foreign Language Listening Anxiety scale (2008).

In Experiment 1, we found a significant difference between the NNES instructor ( $M=3.17$ ,  $SE=0.0891$ ) and the NES instructor ( $M=2.64$ ,  $SE=0.0876$ ) for the amount of self-reported anxiety students felt,  $F(1, 68)=33.4$ ,  $p<.001$ ,  $\eta^2=0.118$ . This finding indicated that participants reported feeling more anxious when they listened to the NNES instructor than when they listened to the NES instructor (see Figure 3).



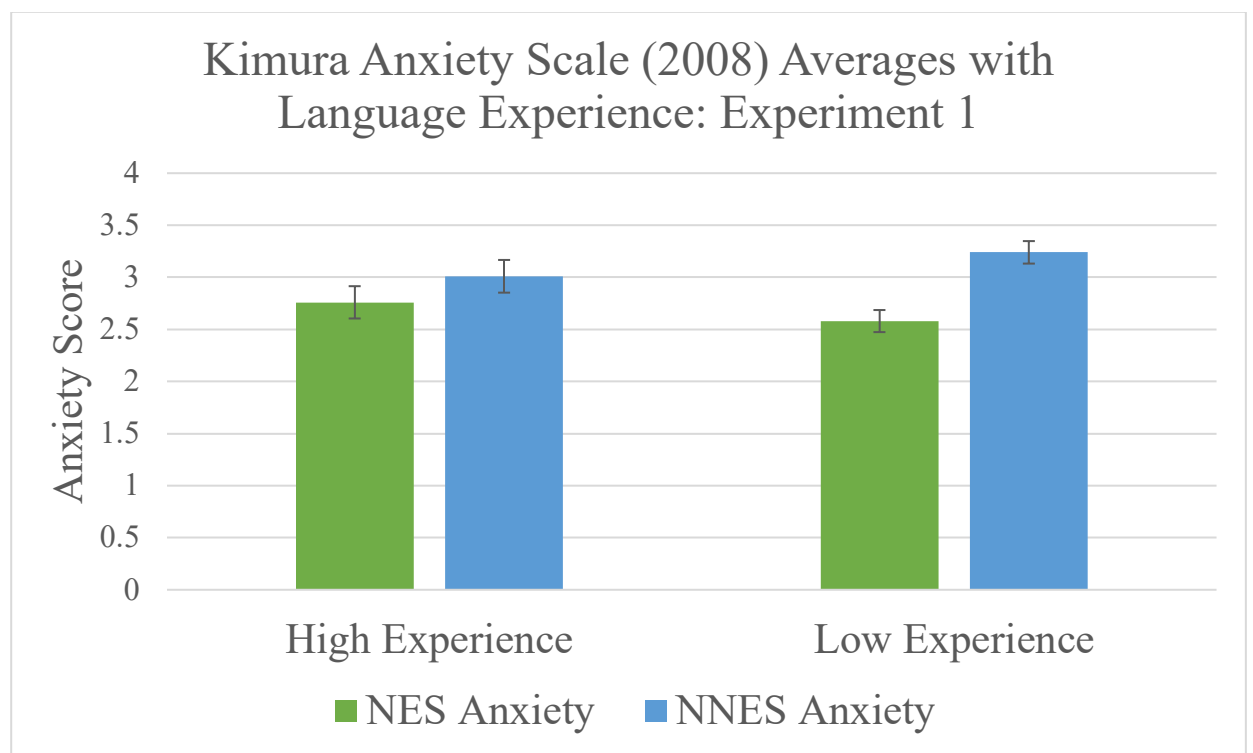


**Figure 3 - Kimura Language Anxiety Scale (2008) Averages for Experiment 1**

We hypothesized that individuals with more experience with Chinese-accented English would experience less anxiety based on Kimura's Foreign Language Listening Anxiety scale (2008) than those who were not experienced in this domain because of their familiarity with the accent. To test this, we separated participants into two groups in both experiments using the Chinese Language Experience scale (McGowan, 2015a; 2015b). We conducted a repeated-measures ANOVA to test for self-reported anxiety levels based on participants' language experience in both experiments.

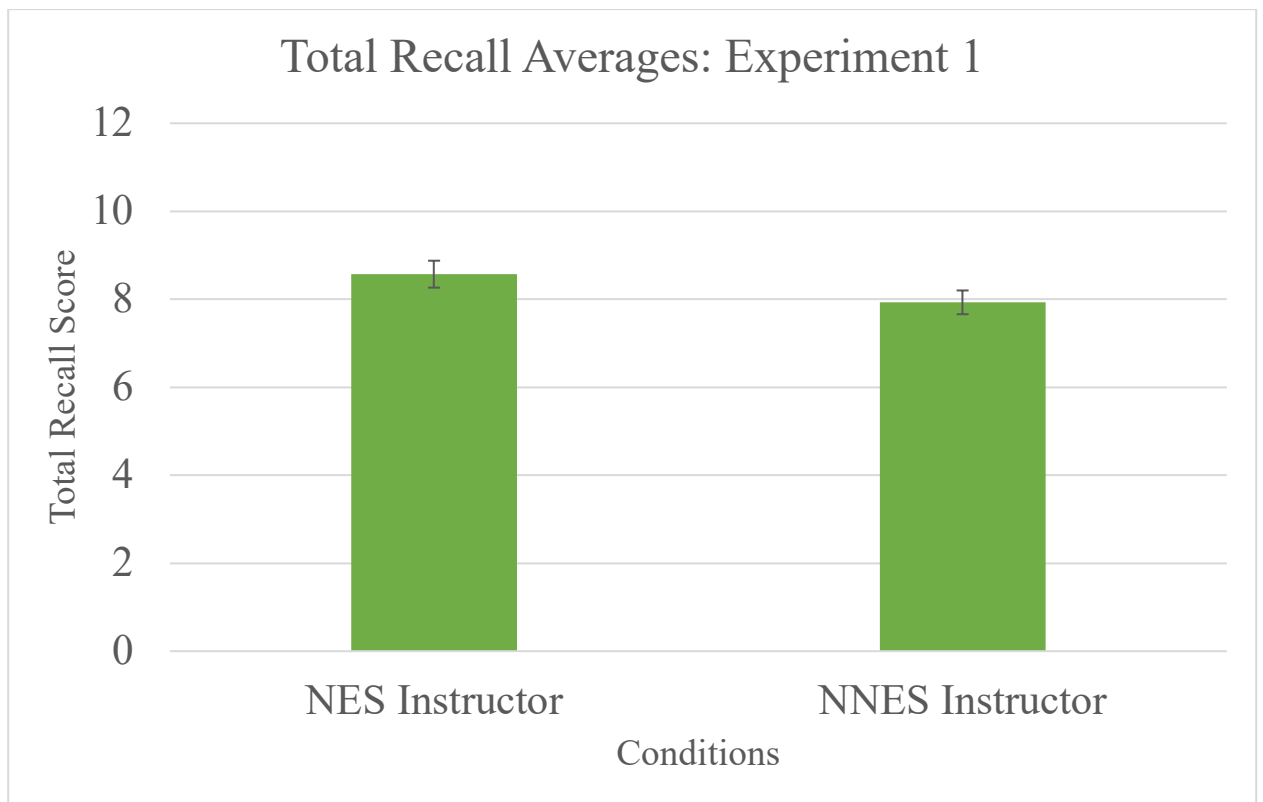
For Experiment 1, there was a significant interaction between instructor type (NES vs. NNES) and participants' experience with Chinese-accented English,  $F(1, 1)=4.75, p=.033, \eta^2 = 0.017$ . The interaction effect indicated that participants with high

Chinese-accented English experience had similar levels of self-reported anxiety that were non-significant for both the NES ( $M=2.76$ ,  $SE=0.155$ ) and NNES ( $M=3.01$ ,  $SE=0.157$ ) instructors. Participants with low experience of listening to Chinese-accented English, in contrast, experienced higher anxiety when they encountered the NNES instructor ( $M=3.24$ ,  $SE=0.108$ ) versus the NES instructor ( $M=3.24$ ,  $SE=0.108$ ; see Figure 4).



**Figure 4 - Kimura Language Anxiety Scale (2008) Averages with Language Experience for Experiment 1**

We conducted a repeated-measures ANOVA to analyze total recall for both experiments. For Experiment 1, we found a main effect of instructor type (NNES vs. NES) on recall performance,  $F(1,68)= 6.49$   $p=0.013$ ,  $\eta^2=0.018$ . Participants had better overall recall performance from the NES instructor's lecture videos ( $M=8.57$ ,  $SE=0.306$ ) than from the NNES instructor's lecture videos ( $M=7.93$ ,  $SE=0.270$ ; see Figure 5).

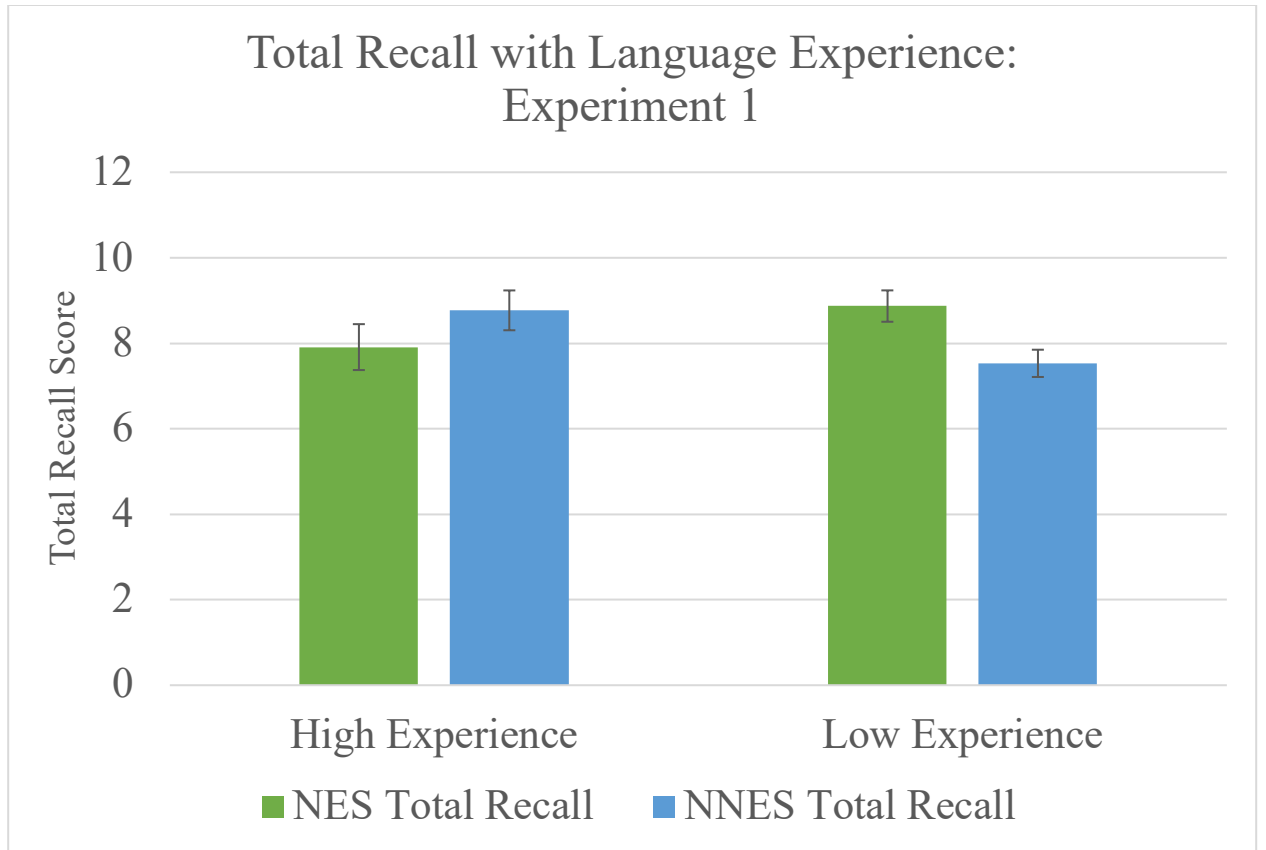


**Figure 5 - Total Recall Scores for Experiment 1**

We hypothesized that individuals with more experience listening to Chinese-accented English would have better total recall performance than those not experienced in this domain. We believe this to be so as the greater cognitive load for the High

Experience group leads to more effective learning (Morris & Chen, 2020; 2021), but for individuals with Low Experience, the NNES lecture videos would likely lead to cognitive overload that renders their learning less effective (Ahn, 2010; Broadbent & Fuller-Tszkiewicz, 2018; Feng et al., 2021; King & Finn, 2017; Mayer et al., 2003; Mayer, 2017; 2018). We conducted a repeated measures ANOVA on the effect of instructor type and language experience on participants' recall performance for both experiments.

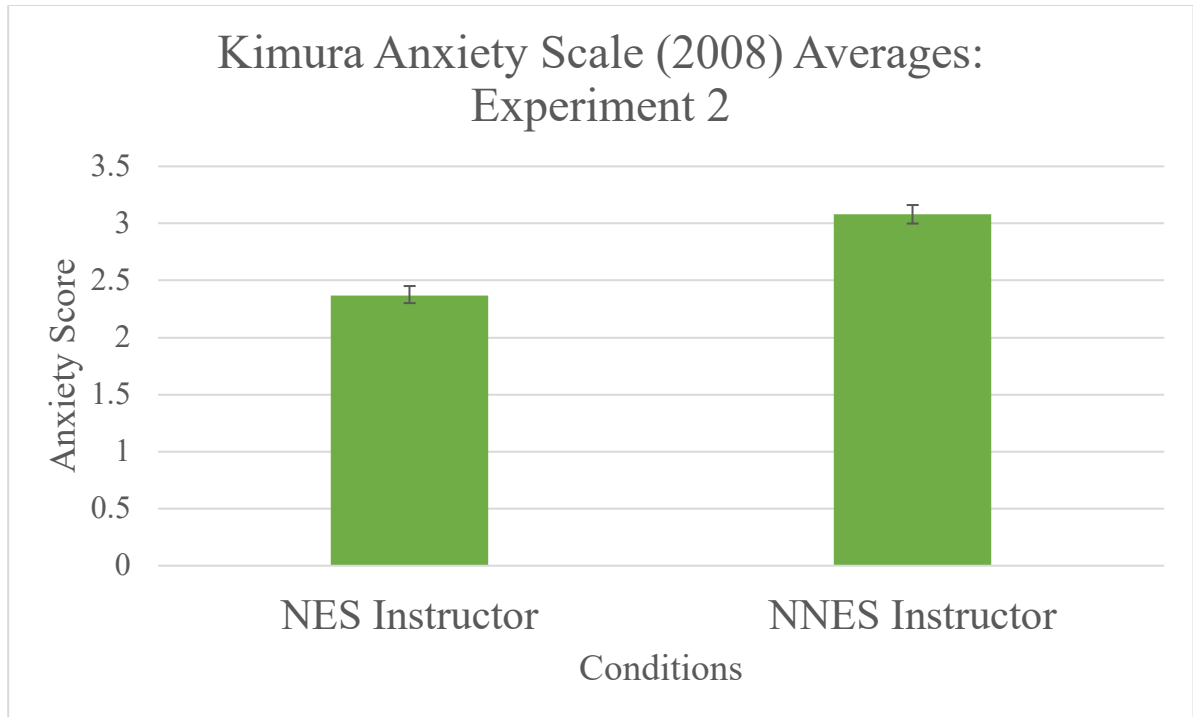
In Experiment 1, there was a significant interaction between instructor type and participants' experience with Chinese-accented English,  $F(1, 1)=422.06, p<.001, \eta^2 = 0.046$ . The observed cross-over interaction indicated that the High Experience group performed better with the NNES instructor ( $M=8.77, SE=0.466$ ) than with the NES instructor ( $M=7.91, SE=0.537$ ). The opposite trend was observed for the Low Experience group, where participants performed better with the NES instructor ( $M=8.87, SE=0.367$ ) than with the NNES instructor ( $M=7.53, SE=0.319$ ; see Figure 6).



**Figure 6 - Total Recall with Language Experience for Experiment 1**

### Experiment 2

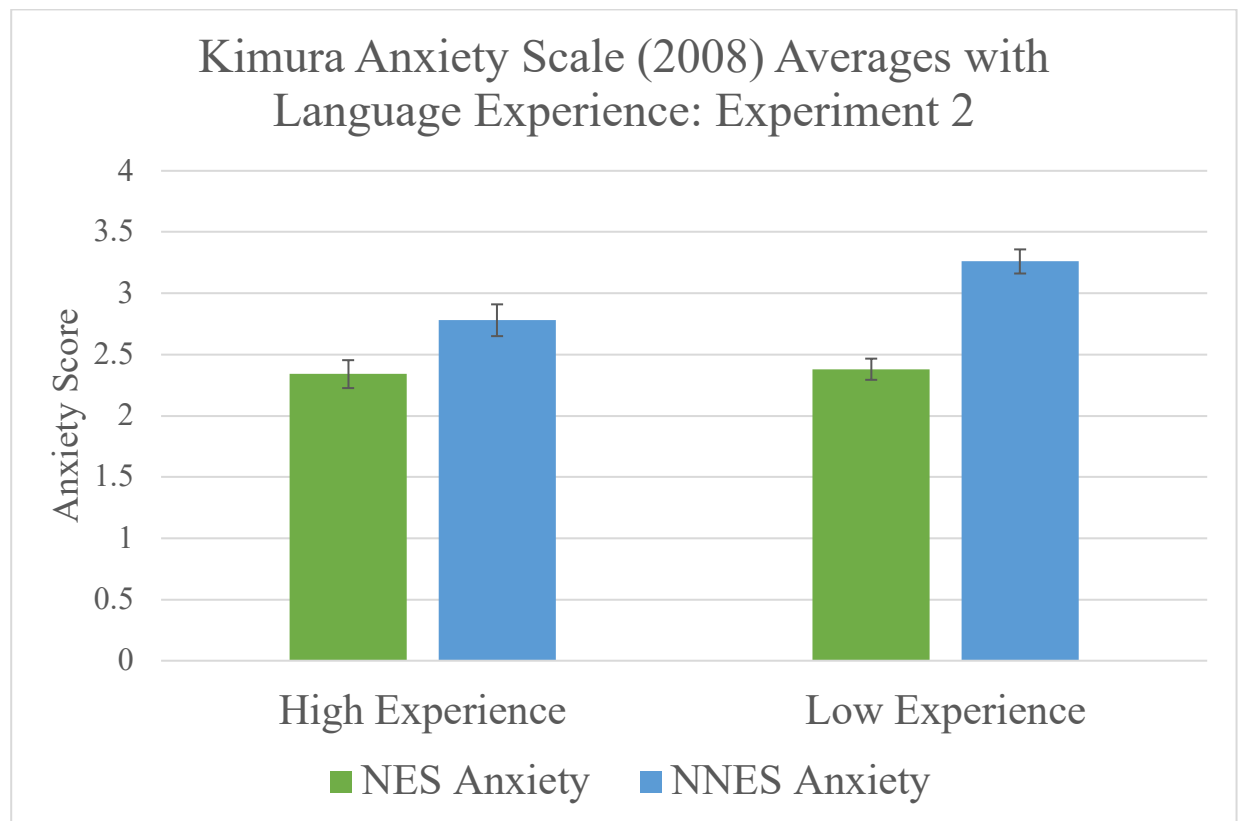
We found similar findings for Kimura's Foreign Language Listening Anxiety scale (2008) in Experiment 2 as we did in Experiment 1. We found a significant difference between the NNES instructor ( $M=3.08$ ,  $SE=0.0812$ ) and the NES instructor ( $M=2.37$ ,  $SE=0.0686$ ) for the amount of self-reported anxiety students felt,  $F(1, 103)=70.3$ ,  $p<.001$ ,  $\eta^2=0.181$ . This finding indicated that participants reported feeling more anxious when they listened to the NNES instructor than when they listened to the NES instructor (see Figure 7).



**Figure 7 - Kimura Language Anxiety Scale (2008) Averages for Experiment 2**

We, again, found similar findings between the first and second experiments when participants were divided into High ( $n=38$ ) and Low ( $n=66$ ) Experience groups. There was a significant main effect of instructor type,  $F(1, 102)=57.85, p<.001, \eta^2 = 0.148$ . A main effect for language experience was observed,  $F(1, 102)=0.4.23, p<.05, \eta^2 = 0.023$ . There was a significant interaction between instructor type (NES vs. NNES) and participants' experience with Chinese-accented English,  $F(1, 1)=6.18, p=.015, \eta^2 = 0.016$ . This indicated that participants with high experience with Chinese-accented English experienced similar levels of self-reported anxiety that were significant for both NES ( $M=2.34, SE=0.1140$ ) and NNES ( $M=2.78, SE=0.1297$ ) instructors. However, participants in the Low Experience group experienced higher levels of self-reported

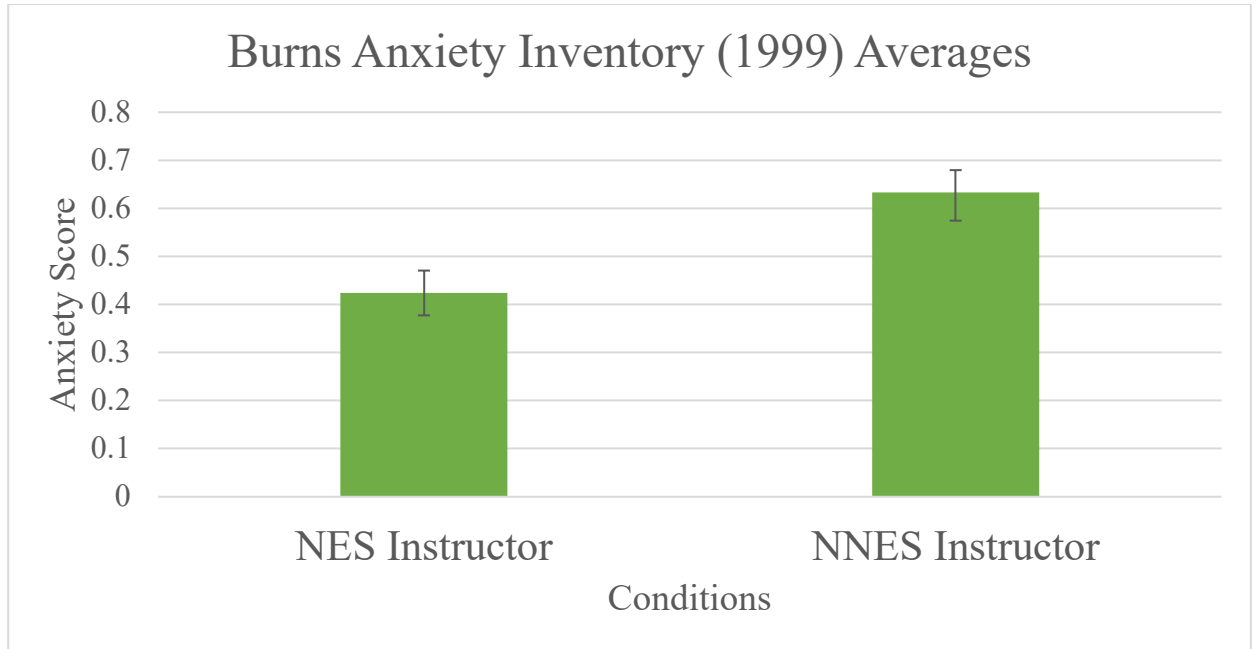
anxiety with the NNES instructor ( $M=3.26$ ,  $SE=0.0984$ ) than with the NES instructor ( $M=2.38$ ,  $SE=0.0865$ ; see Figure 8).



**Figure 8 - Kimura Language Anxiety Scale (2008) Averages with Language Experience for Experiment 2**

For Experiment 2, we included the Burns Anxiety Inventory (1999) as an additional state-trait anxiety measure and conducted a repeated-measures ANOVA to analyze participants' self-reported state-trait anxiety levels. We found a significant difference between the NNES instructor ( $M=0.663$ ,  $SE=0.0586$ ) and the NES instructor ( $M=0.424$ ,  $SE=0.0466$ ) for the amount of self-reported state-trait anxiety students felt,

$F(1, 103)=20.3, p<.001, \eta^2=0.036$ . This finding shows that participants reported feeling more state-trait anxiety when they listened to the NNES instructor provide information than when the NES instructor provided information (see Figure 9).

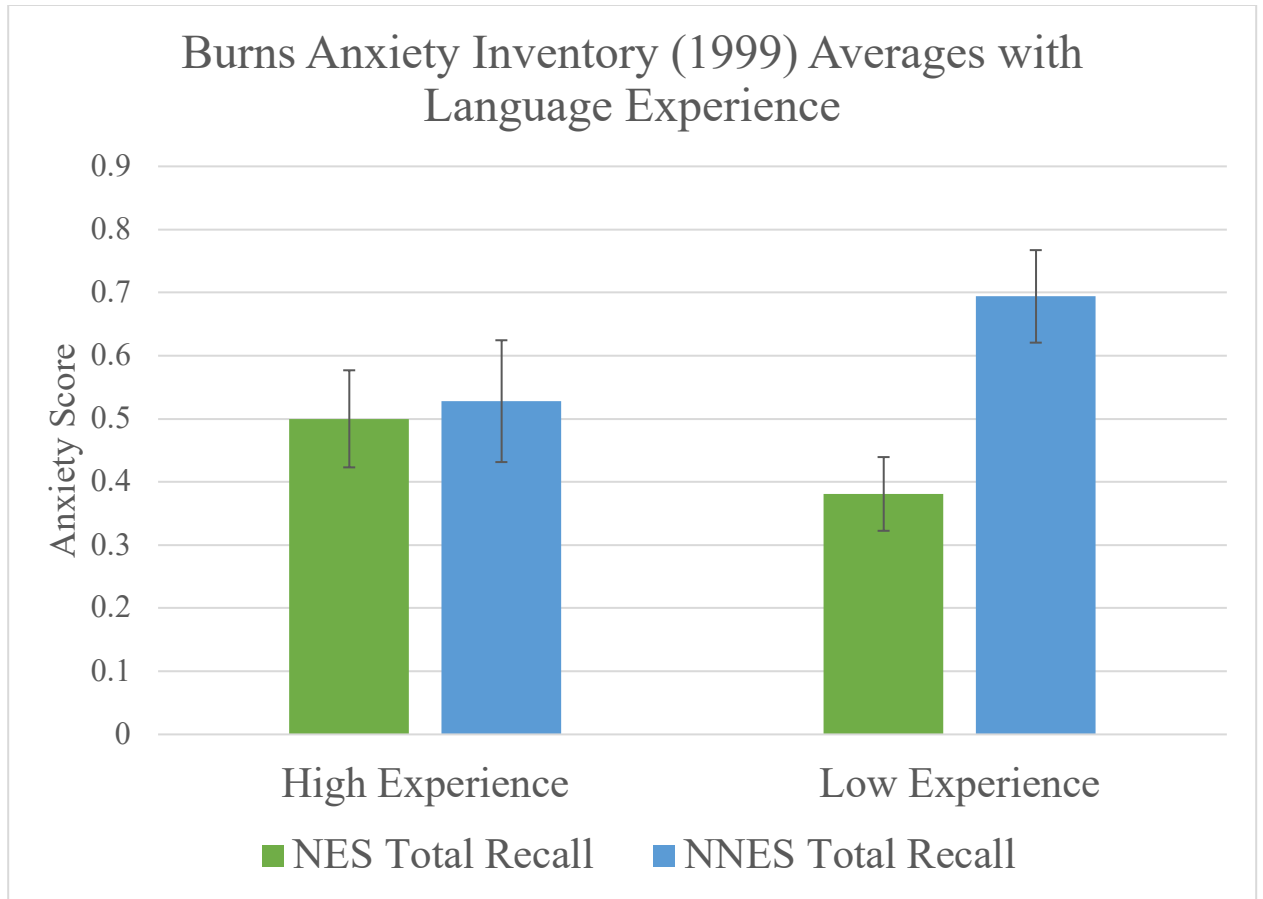


**Figure 9 - Burns Anxiety Inventory (1999) Averages for Experiment 2**

We hypothesized that individuals with more experience with Chinese-accented English would experience less state-trait anxiety based on the Burns Anxiety Inventory (1999) than those who were not experienced in this domain because of their familiarity with the accent. To test this, we separated participants into two groups: High Experience ( $n=38$ ) and Low Experience ( $n=66$ ) (McGowan, 2015a; 2015b).

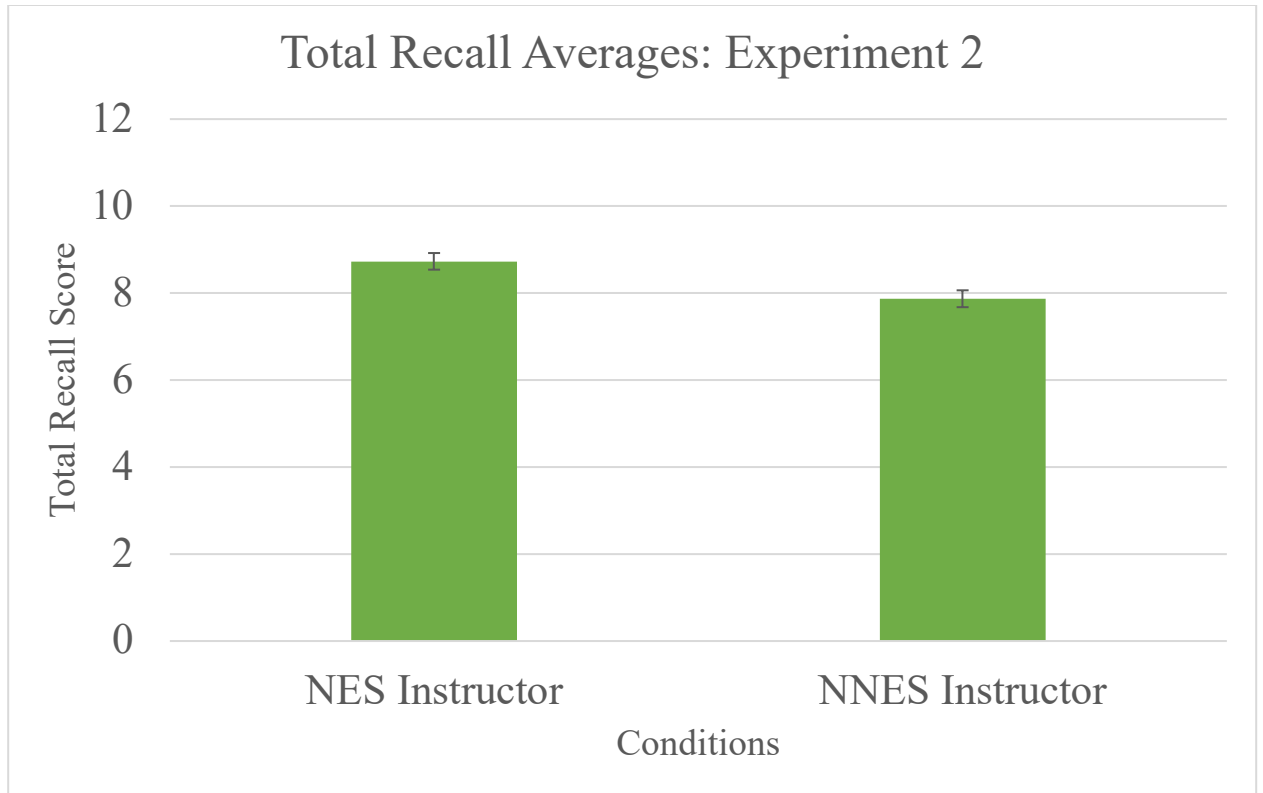


We conducted a repeated-measures ANOVA to test for self-reported state-trait anxiety levels based on a participant's language experience. There was a significant interaction between instructor type (NES vs. NNES) and participants' experience with Chinese-accented English,  $F(1, 1)=9.50$ ,  $p=.003$ ,  $\eta^2 = 0.016$ . This indicated that participants with high experience with Chinese-accented English experienced similar levels of non-significant self-reported state-trait anxiety for both NES ( $M=0.500$ ,  $SE=0.0769$ ) and NNES ( $M=0.528$ ,  $SE=0.0965$ ) instructors. Participants with low experience with Chinese-accented English experienced higher levels of self-reported state-trait anxiety for the NNES instructor ( $M=0.694$ ,  $SE=0.0733$ ) than they did for the NES instructor ( $M=0.381$ ,  $SE=0.0584$ ; see Figure 10).



**Figure 10 - Burns Anxiety Inventory (1999) Averages with Language Experience**

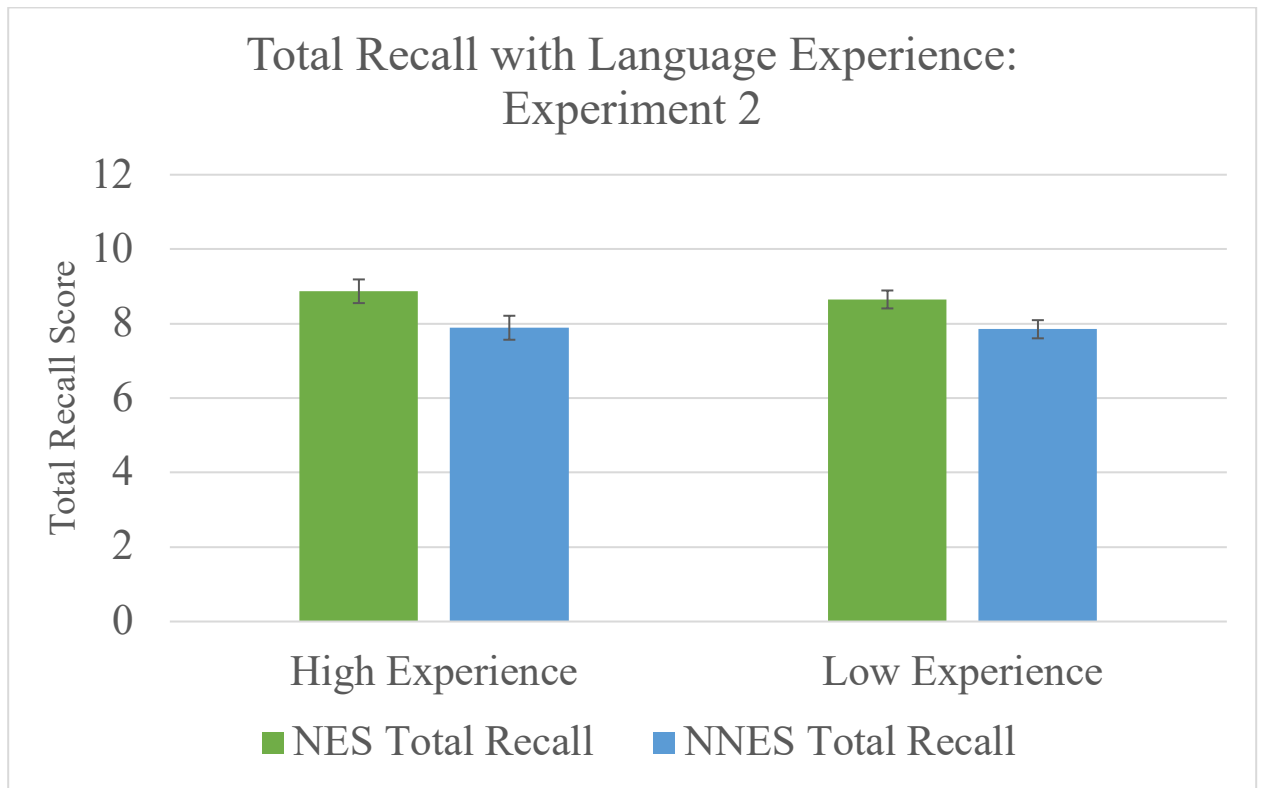
In Experiment 2, we found similar findings for participants' total recall scores as we did in the first experiment. We found a main effect of instructor type (NNES vs. NES) on recall performance,  $F(1, 103)= 12.8, p<0.001, \eta^2=0.047$ . Participants had better overall recall performance from the NES instructor's lecture videos ( $M=8.73, SE=0.191$ ) than from the NNES instructor's lecture videos ( $M=7.87, SE=0.194$ ; see Figure 11).



**Figure 11 - Total Recall Scores for Experiment 2**

The interaction effect between Experiment 1 and 2 were different when participants were divided into High ( $n=38$ ) and Low ( $n=66$ ) Experience groups. A main effect was observed for instructor type on recall performance,  $F(1, 102)=12.376$ ,  $p<0.001$ ,  $\eta^2 = 0.046$ . No main effect was observed for participants' language experience on recall performance,  $F(1, 102)=0.178$ ,  $p>0.05$ . There was no significant interaction between instructor type and participants' experience with Chinese-accented English,  $F(1, 1)=0.114$ ,  $p>0.05$ . This indicated that the High Experience group ( $n=38$ ) performed at the same level as the Low Experience group ( $n = 66$ ) with both the NES instructor (High Experience:  $M=8.87$ ,  $SE=0.318$ ; Low Experience:  $M=8.65$ ,  $SE=0.241$ ) and the

NNES instructor (High Experience:  $M=7.89$ ,  $SE=0.322$ ; Low Experience:  $M=7.85$ ,  $SE=0.244$ ; see Figure 12).



**Figure 12 - Total Recall with Language Experience for Experiment 2**

## CHAPTER 4

### DISCUSSION

These experiments were conducted to compare the differences in students' anxiety levels and memory recall when they encounter an NES instructor versus an NNES instructor. We also considered whether accent familiarity was a moderating variable between these constructs. We tested four different hypotheses: (a) students would experience heightened anxiety when listening to the NNES instructor, and (b) students would experience poorer memory recall when listening to the NNES instructor. We also hypothesized that Chinese language experience would moderate (c) students' anxiety and (d) memory recall.

Two within-group experiments were conducted at a large state university. All participants were undergraduate psychology students at the university and were exposed to both the NES and NNES instructors during both experiments to properly test for any differences between the two instructors regarding anxiety and memory recall.

#### **Participants' Self-Reported Anxiety Levels**

For both experiments, we focused on test anxiety that participants experienced. Test anxiety is commonly thought of being a multi-component phenomenon with two psychological sources: worry and emotionality (Comunian, 1993; Sarason, 1984; Sarason et al., 1990), which can lead to cognitive interference (Arkin et al., 1982;

Comunian, 1993; Kurosawa & Harackiewicz, 1995; Sarason, 1984; Sarason & Sarason, 1981; Sarason & Sarason, 1987).

We examined test anxiety using a modified version of Kimura's Foreign Language Listening Anxiety scale (2008) in both experiments, which focused on participants' anxiety while listening to the instructor. The Kimura scale (2008) also tested if participants perceived that they had adequately taken in the information presented by the instructor. Our second experiment included another test that measured test state-trait anxiety using the Burns Anxiety Inventory (1999). The Burns Anxiety Inventory (1999) measured participants' state of anxiety directly after answering the recall questions. We found that participants experienced higher self-reported anxiety levels with both Kimura's Foreign Language Listening Anxiety scale (2008) and the Burns Anxiety Inventory (1999) when listening to the NNES instructor than when they listened to the NES instructor. This indicated that participants were likely experiencing more test anxiety when listening to the NNES instructor. As previously shown, NES individuals' primary focus while in conversation with NNES individuals is on understanding what they are saying instead of intaking and encoding the information (Grey et al., 2019; Mayer et al., 2003, Morris & Chen, 2020; 2021; Paas et al., 2010; Sweller, 1994; Sweller, 2010; Sweller & Chandler, 1991; Sweller et al., 2019). Focusing on understanding the speaker's speech pattern instead of focusing on encoding the content of the information can cause language perception issues (Feng et al., 2021), which leads to more anxiety in recall situations because learners are aware that they did not properly intake the information presented (Arkin et al., 1982; Comunian, 1993;

Kurosawa & Harackiewicz, 1995; Sarason, 1984; Sarason & Sarason, 1981; Sarason & Sarason, 1987).

When divided into High and Low Experience groups, we found that participants with high experience of listening to Chinese-accented English had similar self-reported anxiety levels for both the NNES and NES instructors in both experiments. There was a discrepancy between the Experiment 1 and Experiment 2's Kimura's Foreign Language Listening Anxiety scale (2008), where the only significant main effect of language experience was found in Experiment 2. We believe that this is due to having more participants within Experiment 2 which, in turn, increased the statistical power in Experiment 2. However, overall, participants in the High Experience group did not feel as much difference in their anxiety level between the two instructors (compared to the Low Experience group), likely because they were more efficient at processing the information from the NNES instructor (Morris & Chen, 2020; 2021). This greater efficiency helps prevent the participants' cognitive threshold from being surpassed (Morris & Chen, 2020; 2021). This means that participants in the High Experience group did not encounter cognitive overload and were not focused on their anxious feelings leading to less anxiety overall with the NNES instructor.

On the other hand, participants in the Low Experience group in both experiments experienced more anxiety with the NNES instructor than the NES instructor. The interaction effect between language experience (High vs. Low) and instructor type (NNES vs. NES) is likely due to cognitive overload (Feng et al., 2021; Morris & Chen, 2020). Cognitive overload is experienced when an individual's cognitive threshold is surpassed and working memory resources are being used for a

specific task (Morris & Chen, 2021; Paas et al., 2010; Sweller, 1994; Sweller, 2010; Sweller & Chandler, 1991; Sweller et al., 2019). Therefore, Low Language Experience participants were likely more focused on understanding the NNES instructor than the content of the information they were being given and encoding that content. This led to the participants becoming aware that they were not encoding the content information, and, in turn, they became anxious that they would not be able to correctly recall the information later during the memory recall section, leading to test anxiety (Arkin et al., 1982; Comunian, 1993; Kurosawa & Harackiewicz, 1995; Sarason, 1984; Sarason & Sarason, 1981; Sarason & Sarason, 1987).

### **Participants' Recall Performance**

In both experiments, we measured participants' recall with two open recall and three multiple-choice questions after each lecture video. Each participant was able to receive 12 points for each instructor type.

When the High and Low Experience groups were combined, participants experienced worse memory recall when the NNES instructor presented information in both experiments. Participants were experiencing higher anxiety levels, likely due to cognitive overload when listening to the NNES instructor. Test anxiety likely also hindered participants' recall performance. Together, test anxiety and cognitive overload caused participants to be more focused on understanding what the NNES instructor was saying rather than on encoding the information they were presenting (Mayer et al., 2003; Morris & Chen, 2020; Paas et al., 2010; Sweller, 1994; Sweller, 2010; Sweller & Chandler, 1991; Sweller et al., 2019). Cognitive overload can also lead to inhibition in the language perception processes, making it even more difficult for students to process



and understand what NNES instructors are saying (Feng et al., 2021). Findings from the current experiments also indicate that, overall, students perform better on tests when they are taught the information by an NES instructor (Ahn, 2010; Broadbent & Fuller-Tszkiewicz, 2018; Feng et al., 2021; King & Finn, 2017; Mayer et al., 2003; Mayer, 2017; 2018). It is hard for students to take in and encode the information when they must overcome cognitive stress and test anxiety.

When we divided the participants into the High and Low Experience groups in our first experiment, we found that those in the High Experience group had better total recall with the NNES instructor, while those in the Low Experience group had better total recall with the NES instructor. Previous research has found that higher cognitive effort leads to enhanced information encoding and better memory recall (Morris & Chen, 2020). These enhancements are likely due to increased focus (Mayer et al., 2003; Morris & Chen, 2020). This increase in focus can facilitate the encoding process, leading to better recall (Morris & Chen, 2020). Those in the High Experience group were likely also able to focus and exert more effort on the content being presented rather than attempting to understand what the NNES instructor was saying (Paas et al., 2010; Sweller, 1994; Sweller, 2010; Sweller & Chandler, 1991; Sweller et al., 2019).

The Low Experience group in Experiment 1, on the other hand, likely experienced cognitive overload because additional cognitive resources had to be allocated to understanding the speech pattern of the NNES instructor (Ahn, 2010; Broadbent & Fuller-Tszkiewicz, 2018; Feng et al., 2021; King & Finn, 2017; Mayer et al., 2003; Mayer, 2017; 2018). Verbal content encoding is one of the more cognitively demanding tasks that we partake in day-to-day. When this process is paired with

additional demand for accent interpretation, competition for cognitive resources can occur (Feng et al., 2021). This competition can result in a diminished ability to properly process speech by impairments in being able to identify similar words from each other, such as pad and pat, and identifying sentence purposes and meanings (Feng et al., 2021; Hunter & Pisoni, 2018; Wurm & Samuel, 1997). In this instance, Low Experience participants' working memory resources were likely dedicated to understanding what the NNES instructor was saying, which left little to no other resources to encode the information for later memory recall (Grey et al., 2019; Mayer et al., 2003, Morris & Chen, 2020; 2021; Paas et al., 2010; Sweller, 1994; Sweller, 2010; Sweller & Chandler, 1991; Sweller et al., 2019).

The participants' recall performance related to Chinese language experience results from Experiment 2 showed a different trend than the results from Experiment 1. When divided into High and Low Experience groups, we found that both groups had better total recall with the NES instructor than they did with the NNES instructor. The interaction effect observed in Experiment 1 was not replicated in Experiment 2. We believe this difference occurred possibly because some participants in the second experiment were taking an in-person or online course taught by an Asian NNES instructor. These participants, we believe, rated themselves as having higher experience with listening to a Chinese-accented instructor because of the course they were taking, which helped serve to lower their anxiety, but did not improve their overall recall. The same Asian NNES instructor did not teach an in-person class during the data collection phase of Experiment 1. It can be speculated that these participants formed false confidence, similar to that of the Dunning-Kruger effect (Kruger & Dunning, 2000),

about their understanding and listening abilities regarding a Chinese-accented instructor. We also know that the said Asian NNES course instructor had learned English at age 10, which was close to the sensitive period discussed earlier of not forming an accent. The Chinese-accented instructor in the Experiment videos had learned English at age 12 and had a relatively more noticeable accent. The NNES Asian instructor's student participants could have caused the discrepancies between the two Experiments; unfortunately, there was no clear and straightforward method to omit the relevant data points as participation was anonymous and participant information was de-identified.

Another possible explanation for the discrepancy in the recall and language experience results between Experiments 1 and 2 is that the participants in the second experiment were more diverse than those in the first. Participants in Experiment 2 indicated that they were from many different states within the United States, and there were two that were not from the United States. Participants in Experiment 1 indicated that they were from states located in the South-Eastern part of the United States, while participants in Experiment 2 indicated that they were from states ranging from the Western to the Eastern parts of the United States or from Australia and Mexico. More participants in Experiment 2 indicated they spoke multiple languages than in Experiment 1. In Experiment 1, 15 participants indicated that they spoke at least one other language in addition to English, while 31 participants in Experiment 2 indicated that they spoke at least one other language in addition to English. Five participants did not speak only English at home or did not speak English at home at all in Experiment 2, while only two participants in Experiment 1 indicated that they spoke English with

another language at home. Three participants in Experiment 2 indicated that they did not speak English as their first language, while all the participants in Experiment 1 stated that English was their first language. Participants in Experiment 2 reported more diverse ethnicities than in the first experiment. Though both experiments did include most participants that identified as White, Experiment 2 included 19 participants that indicated they were another ethnicity (African American, Asian, Hispanic or Latinos, and Other). In contrast, Experiment 1 only contained seven participants that indicated they were not White (African American, Hispanic or Latinos, and Other). These factors could indicate that participants in the second experiment were accustomed to listening to accented English, which resulted in lower anxiety levels. However, this does not mean that they were accustomed to listening to Chinese-accented English, resulting in poor recall when listening to the NNES instructor.

### **Limitations**

There were several limitations to the current experiments. First, we did not actively include a self-perception type of cognitive measure. Including one of these measures could provide a deeper assessment of whether cognitive overload is one of the leading causes of differences between High and Low Experience groups or if there is another possible underlying factor. However, recall performance is a type of behavioral cognitive measure which is more applicable to the classroom.

Second, we did not account for any visual priming cues that could have been presented within the instructors' face cameras. Though the two instructors' face camera videos were as similar as possible, subtle priming cues, such as the NNES instructor wearing glasses and the NES instructor not wearing glasses, were present. These subtle

differences could cause some variation in the instructors' physical appearance, which could affect their attractiveness level to the participants. The effect of these subtle differences is likely minimal due to the facial cameras being a small window in the bottom right corner of the screen. The facial cues intend to provide participants with concrete knowledge of the instructors' ethnicity. This is part of our manipulation and reinforces the idea of accents and NNES individuals in general.

Thirdly, we did not weed out participants in the second experiment who were currently taking a course taught by an Asian NNES instructor. These participants could have affected our results of the second experiment, specifically with the total recall and language experience interaction.

Finally, these experiments' samples were collected from two different semesters. This variation in diversity potentially caused a difference in the diversity level resulting in the difference observed with the total recall and language experience interaction.

### **Implications and Future Directions**

The current experiments have multiple real-world educational implications. For educational settings, it can inform NNES instructors about how their students may be feeling and indicate that they may need to design their online courses to help their NES students understand what they are teaching. NNES instructors may use this information to inform how they design their lecture videos. For example, for complex topics, they may choose not to include their face within the video so that the focus is on the content of the video rather than the students possibly becoming distracted by the instructor. On the other hand, in lecture videos on less complex topics, NNES instructors may include

their faces to promote learning without the worry of exceeding students' cognitive thresholds. NNES instructors could also issue the language experience scale that we used within the experiments to group students into high and low experience groups and provide variations of the lecture videos based on the groups. The high experience students could receive lecture videos that included the instructor's face to promote learning. The low experience group could receive lecture videos that did not include the instructor's face with slower audio and video speed to help prevent cognitive overload.

In the real world, more NNES individuals are becoming part of the business and educational worlds in prominently English-speaking areas. This means that NES individuals will likely converse more and more with NNES individuals. Therefore, a general education requirement in college, and possibly lower educational levels, surrounding different cultures and languages could benefit both parties. Most colleges and universities already have a requirement that students must take a cultural diversity or language class, and the inclusion of this could serve as second language exposure for NES individuals. This exposure could help facilitate the NES individual's efficiency in understanding what an NNES individual is saying. In turn, the enhanced efficiency can lead to lower anxiety levels, as displayed by our High Experience group, which will make conversations between the NES and NNES individuals more comfortable for both parties.

Future studies could focus on expanding to other accents aside from Chinese. It could serve to see if English accents from other areas, such as the United Kingdom or Australia, replicate similar findings. Other English accents of individuals from Germany or France are also worth investigating. It would also be beneficial to determine if there

is a location-specific difference in anxiety and memory recall when receiving information from an NNES instructor. Due to higher exposure, individuals could experience less anxiety and better recall when conversing with NNES individuals in areas with greater language diversity.

## References

- Abdous, M. (2019). Influence of satisfaction and preparedness on online students' feelings of anxiety. *The Internet and Higher Education, 41*(1), 34-44.  
<https://doi.org/10.1016/j.iheduc.2019.01.001>
- Ahn, J. (2010). The effect of accents on cognitive load and achievement: The relationship between students' accent perception and accented voice instructions in students' achievement. OhioLink.
- Alyahya, S. A. (2020). *Social cues in animated pedagogical agents for second language learners: The application of the embodiment principle in video design* (Publication No. 28320859) [Doctoral dissertation, University of South Florida]. ProQuest Dissertation Publishing.  
<https://www.proquest.com/docview/2512416588?pq-origsite=gscholar&fromopenview=true>
- Arkin, R. M., Detchon, C. S., & Maruyama, G. M. (1982). Roles of attribution, affect, and cognitive interference in test anxiety. *Journal of Personality and Social Psychology, 43*(5), 1111-1124. <https://doi.org/10.1037/0022-3514.43.5.1111>
- Atkinson, R. K., Mayer, R. E., & Merrill, M. M. (2005). Fostering social agency theory in multimedia learning: Examining the impact of an animated agent's voice. *Contemporary Educational Psychology, 30*(1), 117-139.  
<https://doi.org/10.1016/j.cedpsych.2004.07.001>
- Berger, C. R. (1979). Beyond initial interactions. In H. Giles & R. St Clair (Eds.), *Language and asocial psychology* (pp. 122-144). Oxford, UK: Blackwell.



- Berger, C. R., & Calabrese, R. (1975). Some explorations initial interactions and beyond: Toward a developmental theory of interpersonal communication. *Human Communication Research, 1*(2), 99-112.
- Briner, B. (2021). *Why do some people have an accent?* The Linguistic Society of America. <https://www.linguisticsociety.org/content/why-do-some-people-have-accent>
- Broadbent, J. & Fuller-Tyszkiewicz, M. (2018). Profiles in self-regulated learning and their correlates for online and blended learning students. *Association for Educational Communications and Technology, 66*(6), 1435-1455. <https://doi.org/10.1007/s11423-01809595-9>
- Bronstein, A., & Ogilvie, M. (1952). The importance of the speech and voice of teacher-candidates as evaluated by appointing officers. *The Journal of Educational Research, 45*(9), 715-720. <https://doi.org/10.1080/00220671>
- Brown, J. S., Woolridge, P. J., & VanBruggen, Y. (1973). Interpersonal relations among psychiatric patients: The determinants of social attractiveness. *Journal of Health and Social Behavior, 14*(1), 51-60. <https://doi.org/10.2307/2136936>
- Burns, D. D. (1999). Burns Anxiety Inventory. <https://doi.org/10.1037/t20069-000>
- Carpenter, S. K., & Mueller, F. E. (2013). The effects of interleaving versus blocking on foreign language pronunciation learning. *Memory & Cognition, 41*, 671–682. <http://dx.doi.org/10.3758/s13421-012-0291-4>

- Carpenter, S. K., & Mickes, L. (2016). The effect of instructor fluency on students' perceptions of instructors, confidence in learning, and actual learning. *Journal of Experimental Psychology: Applied*, 22(2), 161-172.  
<https://doi.org/10.1037/xap0000077>
- Chen, H.-T. M., & Lorch, R. F., Jr. (2018). Effects of audio headings on learning. *Journal of Experimental Psychology: Applied*, 24(2), 207–221. <https://doi.org/10.1037/xap0000143>
- Chen, H-T. M., & Thomas, M. (2020). Effects of audio learning on semi-autonomous driving safety. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 64(1). <https://doi.org/10.1177/1071181320641282>
- Comunian, A. L. (1993). Anxiety, cognitive interference, and school performance of Italian children. *Psychological Reports*, 73(3), 747-754.  
<https://doi.org/10.1177/00332941930733pt105>
- Deffenbacher, J. L. (1980). Worry and emotionality in test anxiety. In I. G. Sarason (Ed.). *Test anxiety: Theory, research, and applications* (pp. 111-128). Hillsdale, NJ; Erlbaum.
- Doubleday, A. F., & Lee, L. M. (2016). Dissecting the voice: Health professions students' perceptions of instructor age and gender in an online environment and the impact on evaluations for faculty. *Anatomical Sciences Education*, 9(6), 537–544. <https://doi.org/10.1002/ase.1609>
- Feng, Y., Meng, Y., Li, H., & Peng, G. (2021). Effects of cognitive load on the categorical perception of Mandarin tones. *Journal of Speech, Language, and*

*Hearing Research*, 64(10), 3794-3802. [https://doi.org/10.1044/2021\\_JSLHR-20-00695](https://doi.org/10.1044/2021_JSLHR-20-00695)

Grey, S., Cosgrove, A. L., & van Hell, J. G. (2020). Faces with foreign accents: An event-related potential study of accented sentence comprehension.

*Neuropsychologica*, 147.

<https://doi.org/10.1016/j.neuropsychologica.2020.107575>

Gudykunst, W. B. (1993). Toward a theory of effective interpersonal and intergroup communication: An anxiety/uncertainty management perspective. In R. L. Wiseman & J. Koester (Eds.), *Intercultural communication competence* (pp. 33-71). Newbury Park, CA: Sage.

Hakuta, K., Bialystok, E., & Wiley, E. (2003). Critical evidence: A test of the critical-period hypothesis for second-language acquisition. *Psychological Science*, 14(1), 31-38.

<https://doi.org/10.1111/1467-9280.01415>

Hart, R., Casserly, M., Uzzell, R., Palacios, M., Corcoran, A., & Spurgeon, L. (2015). Student testing in America's great city schools: An inventory and preliminary analysis. Council of the Great City Schools.

Hammer, M. R., Wiseman, R. L., Rasmussen, J. L., & Brusckhe, J. C. (1998). A test of anxiety/uncertainty management theory: The intercultural adaptation context.

*Communication Quarterly*, 46(3), 309-326.

<https://doi.org/10.1080/01463379809370104>

- Hartshorne, J. K., Tenenbaum, J. B., & Pinker, S. (2018). A critical period for second language acquisition: Evidence from 2/3 million English speakers. *Cognition*, 177, 263-277. <https://doi.org/10.1016/j.cognition.2018.04.007>
- Horst, M., Cobb, T., & Meara, P. (1998). Beyond a clockwork orange: Acquiring second language vocabulary through reading. *Reading in a Foreign Language*, 11(2), 207-221.
- Hunter, C. R., & Pisoni, D. B. (2018). Extrinsic cognitive load impairs spoken word recognition in high- and low-predictability sentences. *Ear and Hearing*, 39(2), 378–389. <https://doi.org/10.1097/AUD.0000000000000493>
- Imamura, M., Zhang, Y. B., & Harwood, J. (2011). Japanese sojourners' attitudes toward Americans: Exploring the influences of communication accommodation, linguistic competence, and relational solidarity in intergroup contact. *Journal of Asian Pacific Communication*, 21(1), 115–132. <https://doi.org/10.1075/japc.21.1.09ima>
- Imamura, M., Zhang, Y. B., & Shim, C. (2012). US host national's intergroup contact experiences with Japanese sojourners: Exploring the role of communication in the intergroup contact hypothesis. *Asian Journal of Communication*, 22(6), 584–600. <https://doi.org/10.1080/01292986.2012.717096>
- Imamura, M., Ruble, R., & Zhang, Y. B. (2016). English proficiency, identity, anxiety, and intergroup attitudes: US Americans' perceptions of Chinese. *Journal of*

*Intercultural Communication Research*, 45(6), 526-539.

<https://doi.org/10.1080/17475759.2016.1240704>

Kimura, H. (2008). Foreign language listening anxiety: Its dimensionality and group differences. *JALT Journal*, 30(2), 173-196.

<https://doi.org/10.37546/JALTJJ30.2-2>

King, P. E., & Finn, A. N. (2017). A test of attention control theory in public speaking: Cognitive load influences the relationship between state trait anxiety and verbal production. *Communication Education*, 66(2), 168-182.

<https://dx.doi.org/10.1080/03634523.2016.1272128>

Kruger, J., & Dunning, D. (2000). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology*, 77(6), 1121-1134.

<https://doi.org/10.1037//0022-3514.77.6.1121>

Kurosawa, K., & Harackiewicz, J. M. (1995). Test anxiety, self-awareness, and cognitive interference: A process analysis. *Journal of Personality*, 63(4), 931-

951. <https://doi.org/10.1111/j.1467-6494.1995.tb00321.x>

Mayer, R. E. (2009). *Multimedia learning* (2nd ed.). New York: Cambridge University Press.

Mayer, R. E. (2017). Using multimedia for e-learning. *Journal of Computer Assisted Learning*, 33(5), 403-423. <https://doi.org/10.1111/jcal.12197>

- Mayer, R. E. (2018). Thirty years of research on online learning. *Applied Cognitive Psychology*, 33(2), 152-159. <https://doi.org/10.1002/acp.3482>
- Mayer, R. E., Sobko, K., & Mautone, P. D. (2003). Social cues in multimedia learning: Role of speaker's voice. *Journal of Educational Psychology*, 95(2), 419-425. <https://doi.org/10.1037/0022-0663.95.419>
- McCarthy, M. M., Herold, K., & Stockman, S. L. (2018). Fast, furious and enduring: Sensitive versus critical periods in sexual differentiation of the brain. *Physiology & Behavior*, 187, 13-19. <https://doi.org/10.1016/j.physbeh.2017.10.030>
- McGowan, K. B. (2015a). Social expectation improves speech perception in noise. *Language and Speech*, 58(4), 502-521. <https://doi.org/10.1177/0023830914565191>
- McGowan, K. B. (2015b). Sounding Chinese and listening Chinese: Awareness and knowledge in the laboratory. In A. M. Babel (Ed.) *Awareness and control in sociolinguistic research*. (pp. 25-51). Cambridge, UK: Cambridge University Press.
- Montgomery, G., & Zhang, Y. B. (2018). Exploring the effects of accent stereotyping and social attraction. *Journal of Language and Social Psychology*, 37(3), 330-349. <https://doi.org/10.1177/0261927X17728361>
- Morris, T., & Chen, H-T. M. (2020). The influence of voice on pedagogical agent's persona and recall performance. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 64(1). <https://doi.org/10.1177/1071181320641111>

- Morris, T., & Chen, H-T. M. (2021). Voice's effect on student effort ratings and recall performance while under cognitive stress. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 65(1), 576-580.  
<https://doi.org/10.1177/1071181321651070>
- Morris, E. W., Davis, M. A., & Hutchings, C. H. (1981). Cognitive and emotional components of anxiety: Literature review and a revised Worry-Emotionality Scale. *Journal of Educational Psychology*, 73, 541-555.  
<https://doi.org/10.1037/0022-0663.73.4.541>
- Ortega, L. (2009). Understanding second language acquisition. Hodder Education.
- Paas, F., van Gog, T., & Sweller, J. (2010). Cognitive load theory: New conceptualizations, specifications, and integrated research perspectives. *Educational Psychology Review*, 22, 115-121. <https://10.1007/s10648-010-9133-8>
- Rahman, M., & Hasan, K. (2019). A study of voiceless inter-dental fricative [θ], [ð] sounds and alveolar liquid [r] sound among Chinese learners of English at a higher educational institution in Malaysia. *Journal of Applied Studies in Language*, 3(2), 148-157. <https://dx.doi.org/10.3194/jasl.v3i2.1470>
- Rubin, D. L. (1992). Nonlanguage factors affecting undergraduates' judgements of non-native English-speaking teaching assistants. *Research in Higher Education*, 33(4), 511-531. <https://doi.org/10.1007/BF00973770>
- Saadé, R. G., Kira, D., Mak, T., & Nebebe, F. (2017). Anxiety and performance in online learning. *Proceedings of the Information Science and Information Technology Education Conference*, 147-157. <https://doi.org/10.28945/3736>

- Sanchez, C. A., & Khan, S. (2016). Instructor accents in online education and their effect on learning and attitudes. *Journal of Computer Assisted Learning*, 32(5), 494-502. <https://doi.org/10.1111/jcal.12149>
- Sarason, I. G. (1984). Stress, anxiety, and cognitive interference: Reaction to tests. *Journal of Personality and Social Psychology*, 46(4), 929-938. <https://doi.org/10.1037/0022-3514.46.4.929>
- Sarason, I.G., & Sarason, B.R. (1981). The importance of cognition and moderator variables in stress. In D. Hagnusson (Ed.). *Toward a psychology of situations: An interactional perspective*. Hillsdale, N.J.: Lawrence Erlbaum Associates.
- Sarason, I. G., & Sarson, B. S. (1987) Cognitive interference as a component of anxiety, measurement of its state and trait aspects. In R. Schwarzer, H. M. van der Ploeg, & C. D. Spielberger (Eds.), *Advances in test anxiety research*. Vol. 4. Lisse: Swets & Zeitlinger. Pp.55-66.
- Sarason, E. G., Sarason, B. R., & Pierce, G. R. (1990). Anxiety, cognitive interference, and performance. *Journal of Social Behavior and Personality*, 5(2), 1-18.
- Sarason, I. G., Sarason, B. S., Keefe, D. E., Hayes, B. E., & Shearin, E. N. (1986). Cognitive interference: situational determinants and trait like characteristics. *Journal of Personality and Social Psychology*, 51(1), 1-12.
- Serra, M. J., & Magreehan, D. A. (2016). Instructor fluency correlates with students' ratings of their learning and their instructor in an actual course. *Creative Education*, 7, 1154-1165. <https://dx.doi.org/10.4236/ce.2016.78120>



- Servilha, E. A. M., & da Costa, A. T. F. (2015). Knowledge about voice and the importance of voice as an educational resource in the perspective of university professors. *CEFAC, 17*(1), 13-26.
- Snell, J., & Andrews, R. (2016). To what extent does a regional dialect and accent impact on the development of reading and writing skills?. *Cambridge Journal of Education, 47*(3), 297-313. <https://doi.org/10.1080/0305764X.2016.1159660>
- Stephan, W., & Stephan, C. (1985). Intergroup anxiety. *Journal of Social Issues, 41*(3), 157-166.
- Stephan, W. G., Stephan, C. W., & Gudykunst, W. B. (1999). Anxiety in intergroup relations: A comparison of anxiety/uncertainty management theory and integrated threat theory. *International Journal of Intercultural Relations, 23*(4), 613-628. [https://doi.org/10.1016/S0147-1767\(99\)00012-7](https://doi.org/10.1016/S0147-1767(99)00012-7)
- Subtirelu, N. (2015). “She does have an accent but...”: Race and language ideology in students’ evaluations of mathematics instructors on RateMyProfessor. *Language in Society, 44*(1), 35-62. <https://doi.org/10.1017/S00474045414000736>
- Sweller, J. (1994). Cognitive load theory, learning difficulty, and instructional design. *Learning and Instruction, 4*(4), 295–312. [https://doi.org/10.1016/0959-4752\(94\)90003-5](https://doi.org/10.1016/0959-4752(94)90003-5)
- Sweller, J. (2010). Element interactivity and intrinsic, extraneous and germane cognitive load. *Educational Psychology Review, 22*, 123–138. <https://doi.org/10.1007/s10648-010-9128-5>

- Sweller, J., & Chandler, P. (1991). Evidence for cognitive load theory. *Cognition and Instruction*, 8(4), 351-362. [https://doi.org/10.1207/1532690xci0804\\_5](https://doi.org/10.1207/1532690xci0804_5)
- Sweller, J., van Merriënboer, J. J. G., & Paas, F. (2019). Cognitive architecture and instructional design: 20 years later. *Educational Psychology Review*, 31, 261-292. <https://doi.org/10.1007/s10648-019-09465-5>
- Tuncay, N., & Uzunboylu, H. (2010). Anxiety and resistance in distance learning. *Cypriot Journal of Educational Sciences*, 5, 142-150.
- Turner, R. N., Hewstone, M., & Voci, A. (2007). Reducing explicit and implicit out-group prejudice via direct and extended contact: The mediating role of self-disclosure and intergroup anxiety. *Journal of Personality and Social Psychology*, 93(3), 369-388. <https://doi.org/10.1037/0022-3514.93.3.369>
- Turner, R. N., Hewstone, M., Voci, A., & Vonofakou, C. (2008). A test of the extended intergroup contact hypothesis: The mediating role of intergroup anxiety, perceived ingroup and out-group norms, and inclusion of the out-group in the self. *Journal of Personality and Social Psychology*, 95(4), 843-860. <https://doi.org/10.1037/a0011434>
- Turner, R. N., West, K., Christie, Z. (2013). Out-group trust, intergroup anxiety, and out-group attitude as mediators of the effect of imagined intergroup contact on intergroup behavioral tendencies. *Journal of Applied Social Psychology*, 43(Suppl 2), E196-E205. <https://doi.org/10.1111/jasp.12019>
- Wang, F., Li, W., Mayer, R. E., & Liu, H. (2017). Animated pedagogical agents as aids in multimedia learning: Effects on eye-fixations during learning and learning

outcomes. *Journal of Educational Psychology*, 110(2), 250-168.

<https://doi.org/10.1037/edu000021>

Wurm, L. H., & Samuel, A. G. (1997). Lexical inhibition and attentional allocation during speech perception: Evidence from phoneme monitoring. *Journal of Memory and Language*, 36(2), 165–187. <https://doi.org/10.1006/jmla.1996.2482>

Zhang, F., & Yin, P. (2009). A study of pronunciation problems of English learners in China. *Asian Social Science*, 5(6), 141-146.

<https://doi.org/10.5539/ass.v5n6p141>

Appendix A: Kimura's Foreign Language Listening Anxiety Scale (2008)

Appendix A: Kimura's Foreign Language Listening Anxiety Scale (2008)

- 1.) While listening to the lecture, I **got stuck** with one or two words that sounded unfamiliar or indistinguishable.
- 2.) It was difficult to understand the instructor.
- 3.) I **was worried** that I might not be able to understand when the instructor talked too fast.
- 4.) I **was nervous** because I was not familiar with the topic of the video.
- 5.) It was easy to make guesses about the parts I couldn't understand or missed [reverse coded].
- 6.) I **was worried** that I might have missed important information because I was distracted by the instructor's voice.
- 7.) I **got nervous** when I didn't understand every word from the lecture video.
- 8.) It was difficult to differentiate words in the lecture.
- 9.) I **felt uncomfortable** listening to the lecture video without a chance to read the typed transcript.
- 10.) I had difficulty understanding the instructions from the video.
- 11.) It was difficult to concentrate on the lecture.
- 12.) I **felt confident** in my listening skills during the lecture. [reverse coded]
- 13.) I got **so confused** by the instructor's voice that I could not remember what I had just listened to.
- 14.) I **fear** I might have acquired inadequate knowledge from the lecture.
- 15.) My thoughts **became jumbled and confused** in listening for important information from the lecture.

- 16.) I **got worried** because I had little time to think about what I had just heard.
- 17.) I **got upset** when I was unsure about whether I had understood the lecture well.
- 18.) I **was worried** I might not understand the lecture.
- 19.) I **felt tense** when listening to the lecture.
- 20.) Listening to new information **made me uneasy**.
- 21.) The thought that I may be missing keywords would **frighten** me.

Appendix B: McGowan (2015a; 2015b) Based Chinese Language Experience and  
Attitude Scale

Appendix B: McGowan (2015a; 2015b) Based Chinese Language Experience and  
Attitude Scale

- 1.) I have experience listening to Chinese-accented English.
- 2.) I have close friends that speak Chinese as a first language.
- 3.) I have at least one family member who speaks Chinese as a first language.
- 4.) I believe that it is socially acceptable to imitate a Chinese accent.
- 5.) I can distinguish a Chinese accent from a Korean or Japanese



Appendix C: The Burns Anxiety Inventory (1999)

### Appendix C: The Burns Anxiety Inventory (1999)

- 1.) Anxiety, Nervousness, Worry, Fear
- 2.) Feeling tensed, stressed, “uptight,” or on edge
- 3.) Difficulty concentrating
- 4.) Racing thoughts or your mind jumping from one thing to the next
- 5.) Concerns of looking foolish or inadequate in front of others
- 6.) Fears of criticism or disapproval
- 7.) Butterflies or discomfort in the stomach
- 8.) Tight, tense muscles