



Katelyn Lee McClure¹ and Hung-Tao Michael Chen²

¹ Psychological Sciences, Kent State University, United States

² Psychological Science, Kennesaw State University, United States

"I could not understand anything they said!": Non-native English-speaking instructors, online learning, and student anxiety

Non-native English-speaking instructors often receive lower course evaluations and are criticized for their accents (Doubleday & Lee, 2016; Rubin, 1992; Sanchez & Khan, 2016; Subtirelu, 2015). This phenomenon has received much research attention in face-to-face classroom settings but less so in a distance education setting. The current study sought to determine if a lecture video with a non-native English-speaking instructor would cause more learner anxiety compared to a lecture video where the instructor had a standard American accent. The study also divided participants into high and low accented-speech experience groups. Participants in the study watched four videos, two with a non-native English-speaking instructor and the other two with an instructor with a Southern American English accent. After each video, participants were asked to recall questions about the information that they had just received before moving on to the following video. Participants were also given an anxiety scale to measure the anxiety they felt while listening to the lecture videos. Our findings indicated that participants with low second language experience had higher anxiety and worse recall performance in the non-native English speaking instructor condition. We also found that participants with high second language experience could potentially benefit from the non-native English speaking instructor's video as they exhibited higher recall performance. Results from the current study have implications for distance education and pedagogical practices.

Key words: online learning, lecture video design, Non-Native English speaking instructor, learning anxiety

Address for correspondence: Katelyn Lee McClure

Psychological Sciences, Kent State University, 600 Hilltop Drive, 44242, Kent, United States

E-mail: kmcclu17@kent.edu

This is an open access article licensed under the CC BY NC ND 4.0 License.

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 instructors, these evaluations may not accurately represent their efforts. Non-native English-speaking 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 (Rubin, 1992). Another factor contributing to this phenomenon that has not been extensively researched is student anxiety. When a native English-speaking student converses with a non-native English-speaking instructor, the student experiences higher levels of anxiety (Ahn, 2010; Hammer et al., 1998; Imamura et al., 2016; Stephan et al., 1999). A student's anxiety may stem from test anxiety (Comunian, 1993; Sarason, 1984; Sarason et al., 1990) and intergroup communication anxiety (Berger, 1979; Berger & Calabrese, 1975; Gudykunst, 1993; Stephan & Stephan, 1985; Stephan et al., 1999). Much has been done to investigate students' anxiety in an in-person classroom setting, but few studies have directly investigated students' anxiety in an online learning environment and the effect of a non-native English-speaking instructor. The current study sought to bridge this gap and examined how a non-native English-speaking instructor's presence in an online learning environment using a picture-in-picture (PIP) lecture video design might affect native English-speaking students' anxiety levels.

A PIP lecture video design typically consists of two components—a PowerPoint slide and the instructor's face visible in the bottom right corner (Chen & Wu, 2015; Guo et al., 2014; Ilioudi et al., 2013; Kokoç et al., 2020). PIP lecture videos have been shown to be highly beneficial for students in an online learning environment (Chen & Wu, 2015; Guo et al., 2014; Kokoç et al., 2020). Specifically, they have been shown to reduce students' cognitive load levels and improve students' learning performance on measures of testing and assignments (Chen & Wu, 2015; Wang & Antonenko, 2017). These lecture video designs have been prevalent for years and are now an integral part of online and hybrid education. Many PIP lecture design studies include students and instructors who speak the same language and live in the same culture (Chen & Wu, 2015; Kokoç et al., 2020; Sadik, 2016; Wang & Antonenko, 2017). The current study, however, explored the effect of PIP lecture videos on students with an instructor who had a different first language and culture than them and how this may directly affect students' anxiety levels.

Two cognitive channels are involved in processing an online lecture video – audio and visual. The dual-channel hypothesis is based on the cognitive theory of multimedia learning (CTML; Mayer, 2005, 2009, 2017; Moreno & Mayer, 1999; Sweller et al., 2019). The dual-channel idea posited by CTML assumes that there are separate audio and visual channels for processing incoming information that come together to help individuals understand the information being presented (Mayer, 2017). The main issue native English-speaking students face with non-native English-speaking instructors is one of accent and visual cue unfamiliarity.

Auditorily, native English-speaking students are tasked with decoding the non-native English-speaking instructor's accent and speech pattern. Visually, native English-speaking students may inherently assume difficulties with understanding the instructor based on their physical appearance.

On the audio channel part, native English-speaking students are tasked with processing an accent and a speech pattern they are unfamiliar with. A non-native English speaker, or second language (L2) speaker, is defined as an individual who has learned another language after thoroughly learning what can be considered their primary language (Lantolf, 1990; Ortega, 2009; Scovel, 2000). In the current study, the non-native English-speaking instructor was someone who had learned to speak English after age 10, which is after the critical language learning age (Lantolf, 1990; Ortega, 2009; Scovel, 2000). The instructor in the current study spoke with an accent different from an American English accent typical to the region where the study was conducted. When a native-English speaking individual communicates with a non-native English-speaking individual, they often report experiencing difficulties processing the non-native English-speaking individual's accent. Mayer et al. (2003) found that a machine-synthesized and a Russian-accented voice resulted in worse student learning performance than a Midwestern American-accented voice. In addition, the machine-synthesized voice and Russian-accented voice were deemed less attractive than the Midwestern American-accented voice (Mayer et al., 2003). It has also been shown that non-native English-speaking individuals typically speak English with more pauses in order to process what to say next, resulting in native English-speaking individuals rating them as less capable conversational partners (Carpenter & Mueller, 2013; Carpenter & Mickles, 2016; Serra & Magreehan, 2016; Sanchez & Khan, 2016). Atkinson et al. (2005) tested this idea of fluency in an educational setting with a Midwestern American accented voice and a female computer-synthesized voice. The students who participated in the study rated the Midwestern American accented voice as more attractive and had better overall recall (Atkinson et al., 2005). These studies showed the importance of accent and speech pattern familiarity in the learning environment. Unfamiliar accent and speech pattern by the instructor could lead to worse learning performance in a distance education setting.

On the visual channel part, the instructor's presence typically helps facilitate students' connection and understanding of the material being presented (Chen & Wu, 2015; Guo et al., 2014; Kokoç et al., 2020; Wang & Antonenko, 2017). For non-native English-speaking instructors, however, their presence could have the opposite effect (Grey et al., 2019; Munro & Derwing, 1995; Villarreal, 2013; Yi et al., 2013; Yi et al., 2014). One reason for these issues could be that it takes more cognitive effort to simultaneously process a non-native English-speaking instructor's accent and face (Grey et al., 2019; Munro & Derwing, 1995; Villarreal, 2013; Yi et al., 2013; Yi et al., 2014). This effort results in more working memory resources being dedicated to processing unfamiliar facial features and speech (Grey et al., 2019; Munro & Derwing, 1995; Villarreal, 2013; Yi et al., 2013; Yi et al., 2014).

In a study conducted by Grey et al. (2019), participants were either shown a picture of a Caucasian speaker or a non-Caucasian speaker. The speaker's picture was paired with either American-accented English speech or non-American accented English speech. EEG recordings found that more parts of the brain were activated when presented with a non-native-English speaker's picture, whether or not the accompanying speech was accented or non-accented English (Grey et al., 2019). With more areas of the brain activated, these working memory resources may surpass what is known as the cognitive load threshold, causing cognitive overload (Engström et al., 2017; Schneider et al., 2018). When an individual experiences cognitive overload, it is difficult for them to understand and process the information being presented, leading to an inability to encode or retrieve information (Morris & Chen, 2020, 2021). This inability to encode and recall information later may cause issues for students in an educational environment because they will likely perform poorly in testing situations.

How Anxiety Affects Students' Understanding of a Non-native-English-Speaker's PIP Lecture Videos

The anxiety experienced by native English-speaking students when learning from a non-native English-speaking instructor is likely due to intergroup communication anxiety (ICA). ICA refers to a situation where 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., 2013). The individual in the dominant culture, the native English-speaking group in the current study, fears that the ingroup's power and control 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., 2013). The outgroup individual, the non-native English-speaking 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 online education setting, native English-speaking students could potentially be worried about not having control over their grades and learning outcomes. These native English-speaking students could view any issues experienced within the class and their grades as directly resulting from the fact that they have a non-native English-speaking instructor. Therefore, the students could feel that they do not have proper control and power over their learning and performance in the class. This sense of losing control and power likely stems from the fact that it is more effortful to understand a non-native English-speaking instructor than a native English-speaking instructor. This type of ICA is our focus. The current study hypothesized that online native English-speaking students could potentially experience anxiety over their inability to control the outcomes in the course due

to the perceived greater difficulty in acquiring information from the non-native English-speaking instructor.

ICA can also cause psychological distancing between native English-speaking students and non-native English-speaking instructors (Turner et al., 2007; Turner et al., 2008; Turner et al., 2015). The more intergroup anxiety an individual is experiencing, the less likely they are to approach someone outside their group. This means that both groups are aware, to some extent, that there are extra factors they do not have direct control over when communicating with others outside of their group (Turner et al., 2007; Turner et al., 2008; Turner et al., 2015). To avoid experiencing difficulties in understanding, both groups may actively decide to avoid communicating with the other (Turner et al., 2007; Turner et al., 2008; Turner et al., 2015). Therefore, it is possible that a native English-speaking student could be experiencing trouble with the material presented in the course but could be too uncomfortable in approaching the non-native English-speaking 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).

In an education setting involving a non-native English-speaking instructor and native-English speaking students, ICA can be measured in terms of the test anxiety that students experience. Test anxiety has been defined as a multi-component phenomenon with two psychological sources: worry and emotionality (Comunian, 1993; Sarason, 1984; Sarason et al., 1990). Worry is the cognitive factor that is an individual's conscious concern about their performance on the test, while emotionality is the arousal response to the test 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, leading to distracting thought patterns (Comunian, 1993; Kurosawa & Harackiewicz, 1995; Sarason, 1984). These distracting thought patterns typically lead to the poorer 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 the primary source of student anxiety is derived from testing, specifically, the fear of failure, derived from the complications of native English-speaking students being taught by non-native English-speaking instructors (Arkin et al., 1982; Comunian, 1993; Kurosawa & Harackiewicz, 1995; Sarason, 1984; Sarason & Sarason, 1981; Sarason & Sarason, 1987).

The current study compared the difference in students' test anxiety and recall performance between a native English-speaking instructor and a non-native English-speaking instructor. We hypothesized that (a) students would experience higher test anxiety in the non-native English-speaking instructor condition, (b) students would have worse recall in the non-native English-speaking instructor condition than the native English-speaking instructor condition, and (c) accent familiarity level would cause a difference in how learners respond to non-native English-speaking instructors and native English-speaking instructors.

Experiment 1

Method

Participants

An a priori power analysis was completed in GPower, where we assumed a moderate effect size of .3 at 80% power (Faul et al., 2007), and the estimated sample size was 71. The current study had 69 participants in Experiment 1.

Materials and Procedure

The current study's materials were adapted from previous studies (Chen & Lorch, 2018; Chen & Thomas, 2020). The study was conducted in a laboratory setting with a 2×2 factorial design. The first independent variable (IV) was within-group, and participants watched two videos recorded by the native English-speaking instructor and two videos recorded by the non-native English-speaking instructor. The second IV was between-groups, and participants were divided into a high or low Chinese language experience group based on their cumulative score on the Chinese language experience scale (McGowan, 2015a, 2015b). The experiment materials were hosted in Qualtrics, an online survey platform. 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. The Qualtrics system used the random assignment logic to assign participants to one of two video lecture conditions: one that began with a non-native English-speaking instructor and the other that started with a native English-speaking instructor.

Before interacting with any study materials, participants were taken through a consent process. Participants received an oral explanation about the general process of the study from the researcher and were given a physical copy of a consent form that detailed their rights while participating and any potential risks. Participants were allowed to participate in the study after they consented to participate.

Before the experiment lectures, participants were 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 native-English speaking and non-native English-speaking instructors for the experiment lecture videos. The sample video served to acclimate participants to the type of instruction they would be receiving and the questions they would be asked.

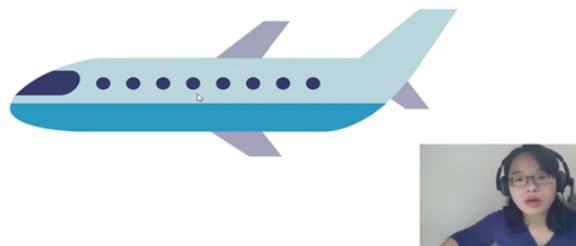
After the instructional phase, participants were randomly assigned to one of two study conditions. Each condition had the native English-speaking and non-native English-speaking instructors present, and the order of the native English-speaking and non-native English-speaking instructor videos was counterbalanced between the groups. The first two videos were recorded by a native English-speaking instructor for one group. The non-native English-speaking

instructor recorded the first two videos for the other group. The lecture videos were normed such that video one included the same information regardless of whether the instructor was a native English speaker or a non-native English speaker. Similarly, the second, third, and fourth videos were also normed. Individual lecture videos were presented as a narrated PowerPoint presentation (see Figure 1). Instructors' faces appeared in a small window in the bottom right corner of the PowerPoint. The native English-speaking instructor had a Southern American English accent native to the area in which the study was conducted. The non-native English-speaking instructor was a Mandarin-accented speaker who learned English at 12 years of age and had a noticeable but comprehensible accent. The first condition of the study contained the native English-speaking instructor for the first two lecture videos and the non-native English-speaking instructor for the last two lecture videos. The second condition of the study contained the non-native English-speaking instructor for the first two lecture videos and the native English-speaking 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. Each video contained pictures in the center of the video to help depict the force of flight being currently discussed (see Figure 1). The script and pictures for all videos were the same for both instructors. Each video covered simple details about how each force affected airplane flight and how the airplane's design helped to overcome or utilize these forces.

After each lecture video, participants were asked questions about the video's main concepts. They were first presented with two open-recall questions. The first of these questions asked the participant to identify the force of flight discussed in the video. The second question asked participants to list two parts of the airplane that were used to help overcome the force discussed. The PI and six undergraduate research assistants scored all open-recall questions. A scoring guide was provided to the scorers. Interrater reliability was calculated using Cohen's κ before all participants' open recall questions were scored. Reliability was found to be high, $\kappa = .87$. All re-

Figure 1. *Non-native English-speaking Instructor*



search assistants met with the PI to discuss all discrepancies before scoring the rest of the participants, who were equally divided among the research assistants and the PI. After the open-recall questions, participants 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 (2008) Foreign Language Listening Anxiety scale. This scale contained 20 questions to assess participants' anxiety while listening to the instructor ($\alpha = .84$; 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 participants' anxiety while learning about aeronautical engineering from each instructor (Kimura, 2008).

After completing the anxiety scale (Kimura, 2008) the second time, participants completed a questionnaire about their familiarity and attitudes towards non-native 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 personal experience. Participants were asked about their level of agreement with 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 non-native-accented English (McGowan 2015a, 2015b). This was a measured variable because participants' understanding of "accent familiarity" could vary between each individual. This measured variable gave the researcher some control over dividing participants as accurately as possible. Following McGowan's (2015a, 2015b) classification method, participants with average ratings of 1-2 were classified as "low experience." Participants with average ratings of 3-5 were classified as "high experience." Accent familiarity could decrease a student's cognitive load level during learning (Morris & Chen, 2020, 2021).

Finally, participants were asked to fill out demographic information. Participants were asked about their gender, age, race, county and state they have lived in most of their life, the language spoken at home, the highest level of education, and if English was their first language.

Results and Discussion

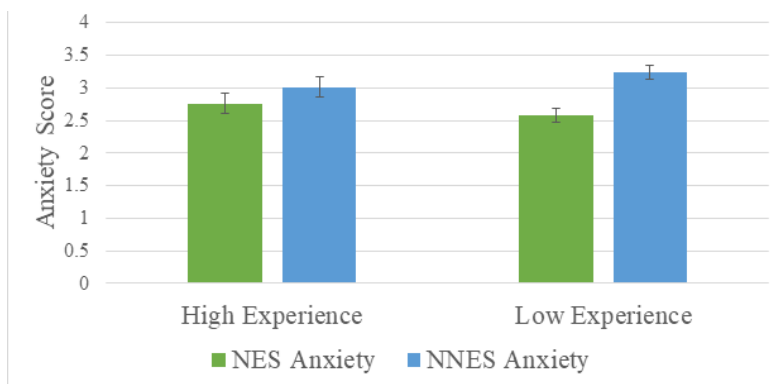
We conducted a repeated-measures analysis of variance (ANOVA) to analyze participants' self-reported anxiety levels (Kimura, 2008). We found a statistically significant difference between the non-native English-speaking instructor ($M = 3.17$, $SE = 0.09$) and the native English-speaking instructor ($M = 2.64$, $SE = 0.09$) conditions for the amount of self-reported anxiety students felt, $F(1, 68) = 33.40$, $p < .001$, $\eta^2 = .12$. This finding indicated that participants reported feeling more anxious when they listened to the non-native English-speaking instructor than when they listened to the native English-speaking instructor.

We hypothesized that individuals with more experience with Chinese-accented English would experience less anxiety based on Kimura's (2008) Foreign Language Listening Anxiety scale than those not experienced in this domain because of their familiarity with the accent. To test this, we separated participants into two groups (high experience, $n = 22$, low experience, $n = 47$) 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 conditions. There was a statistically significant main effect of instructor type, $F(1, 67) = 22.52, p < .001, \eta^2 = .08$. No main effect for language experience was observed, $F(1, 67) = 0.0180, p = .894, \eta^2 = 0$. There was a statistically significant interaction between instructor type (native English speaker vs. non-native English speaker) and participants' experience with Chinese-accented English, $F(1, 1) = 4.75, p = .033, \eta^2 = .02$. The interaction effect indicated that participants with high Chinese-accented English experience had similar self-reported anxiety levels for both the native English-speaking ($M = 2.76, SE = 0.16$) and non-native English-speaking ($M = 3.01, SE = 0.16$) instructors. On the other hand, participants with low experience of listening to Chinese-accented English experienced higher anxiety when they encountered the non-native English-speaking instructor ($M = 3.24, SE = 0.11$) versus the native English-speaking instructor ($M = 2.58, SE = 0.11$).

We conducted a repeated-measures ANOVA to analyze total recall. We found a main effect of instructor type (non-native English speaker vs. native English speaker) on recall performance, $F(1,68) = 6.49, p = .013, \eta^2 = .02$. Participants had better overall recall performance from the native English-speaking instructor's

Figure 2. *Language Anxiety Scale (Kimura, 2008) Averages with Language Experience for Experiment 1*



Note. Participants with high experience listening to Chinese-accented English felt similar anxiety with both instructors. Participants with low experience listening to Chinese-accented English felt significantly more anxiety with the non-native English-speaking (NNES) instructor than with the native English-speaking (NES) instructor.

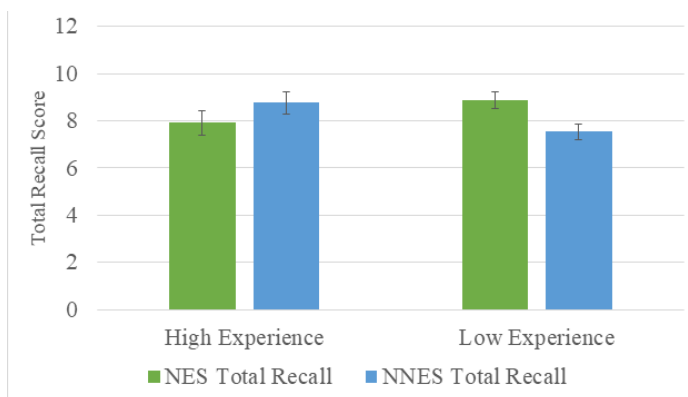
lecture videos ($M = 8.57$, $SE = 0.31$) than from the non-native English-speaking instructor's lecture videos ($M = 7.93$, $SE = 0.27$).

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 non-native English speaker lecture videos would likely lead to cognitive overload that renders their learning less effective (Ahn, 2010; Broadbent & Fuller-Tyszkiewicz, 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 (high experience, $n = 22$, low experience, $n = 47$) on participants' recall performance. No main effect was observed for instructor type on recall performance, $F(1, 67) = 1.03$, $p = .313$, $\eta^2 = 0$. No main effect was observed for participants' language experience on recall performance, $F(1, 67) = 0.06$, $p = .806$, $\eta^2 = 0$. There was, however, a statistically significant interaction between instructor type and participants' experience with Chinese-accented English, $F(1, 1) = 36.40$, $p < .001$, $\eta^2 = .05$. The observed cross-over interaction indicated that the high experience group had better recall with the non-native English-speaking instructor ($M = 8.77$, $SE = 0.45$) than with the native English-speaking instructor ($M = 7.91$, $SE = 0.54$). The opposite trend was observed for the low experience group, where participants had better recall with the native English-speaking instructor ($M = 8.87$, $SE = 0.37$) than with the non-native English-speaking instructor ($M = 7.53$, $SE = 0.32$).

Overall, we observed that participants had better recall with the native En-

Figure 3. *Total Recall with Language Experience for Experiment 1*



Note. There is a cross-over interaction between the high and low experience groups. The high experience group exhibited better total recall with the non-native English-speaking (NNES) instructor, whereas the low experience group exhibited better total recall with the native English-speaking (NES) instructor.

glish-speaking instructor than they did with the non-native English-speaking instructor. As discussed previously, this was likely because participants placed more focus on understanding what the non-native English-speaking instructor was saying rather than intaking and encoding the information being presented (Grey et al., 2019; Mayer et al., 2003; Morris & Chen, 2020, 2021; Paas et al., 2010; Sweller, 1994, 2010; Sweller & Chandler, 1991; Sweller et al., 2019). This inability to encode efficiently resulted in participants being unable to recall the information needed to perform well in the test-like situation, resulting in lower overall recall performance for the non-native English-speaking instructor condition.

Participants with high experience had better recall with the non-native English-speaking instructor than with the native English-speaking instructor. Low experience participants, on the other hand, had better recall performance with the native English-speaking instructor than they did with the non-native English-speaking instructor. These differences likely resulted from the high experience participants' relative ease in processing the speech pattern and accent of the non-native English-speaking instructor, allowing them to focus more on encoding the content information being presented (Paas et al., 2010; Sweller, 1994; Sweller, 2010; Sweller & Chandler, 1991; Sweller et al., 2019). Because of the relative ease in processing a second language, high experience participants likely did not experience cognitive overload. In other words, the cognitive effort of the high experience participants directly translated into learning performance (Mayer et al., 2003; Morris & Chen, 2020, 2021). In contrast, low experience participants likely had to devote more cognitive resources to processing the speech pattern and accent of the non-native English-speaking instructor. When the low experience participants had to work harder to process the instructor's speech pattern, accent, and the lecture's content information, they likely experienced cognitive overload and the cognitive overload led to worse recall performance.

In terms of the anxiety measure, we observed a significant effect of instructor type on the amount of self-reported anxiety that participants experienced. This experience of anxiety was likely because participants had worse overall recall performance in the non-native English-speaking instructor's lecture segments. According to the ICA theory, participants likely experienced a sense of loss of control when they performed worse in the recall tasks of the non-native English-speaking instructor's lecture segments (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., 2013).

When we separated participants by their language experience, participants in the high experience group indicated similar anxiety level regardless of the instructor type. As evident from our recall findings, high experience participants did not suffer from worse recall performance in the non-native-English-speaking instructor's lecture segments. On the other hand, participants in the low experience group indicated that they felt more anxiety with the non-native English-speaking instructor, likely because they had worse recall performance.

Experiment 2

The second experiment was conducted to better measure state-trait anxiety in a test-like situation. State-trait anxiety is the experience of unpleasant emotions in a specific situation in response to certain stressors that can be due to environmental or social cues (Endler et al., 1994). State-trait anxiety measures participants' general experience in the current study instead of their specific response to the instructor's speech (Arkin et al., 1982; Comunian, 1993; Kurosawa & Harackiewicz, 1995; Sarason, 1984; Sarason & Sarason, 1981; Sarason & Sarason, 1987). That is, it measures participants' anxiety not just during the listening phase of the study, but also includes the anxiety experienced during the recall part of the experiment. The idea is that test anxiety becomes apparent to the student in the moments during the test, wherein they become focused on their personal thoughts and feelings that obstruct their ability to recall any previous information to perform well on the test (Arkin et al., 1982; Comunian, 1993; Kurosawa & Harackiewicz, 1995; Sarason, 1984; Sarason & Sarason, 1981; Sarason & Sarason, 1987). Therefore, a state-trait anxiety measure could better capture and represent test anxiety in a test-like situation rather than the language listening anxiety alone.

Method

Participants

We used the same a priori power analysis of .3 at 80% power that estimated a sample size of 71 (GPower, Faul et al., 2007). The current study had 104 participants in Experiment 2 and thus had more than adequate power.

Participants were all university students recruited from the psychology subject pool at a large state university. For Experiment 2, the ages of the participants ranged from 17 to 53 ($M = 21.30$, $SD = 6.81$), with most participants identifying as female (16 males, 83 females, 4 nondisclosures, and 1 other). Most participants identified their race 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. 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 spoke English and one other language. Most participants indicated 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.

Materials and Procedure

The lecture stimuli in Experiment 2 were the same as in Experiment 1. For the dependent variable, we used a shortened version of the Burns Anxiety Inven-

tory (Burns, 1999; $\alpha = .86$; see Appendix C) after each lecture video. The Burns Anxiety Inventory measured state-trait anxiety instead of the anxiety that resulted from second language exposure. The procedure of Experiment 2 was similar to Experiment 1, apart from the inclusion of the Burns Anxiety Inventory.

Results and Discussion

For Experiment 2, we conducted a repeated-measures ANOVA to analyze participants' self-reported state-trait anxiety levels derived from the Burns Anxiety Inventory (Burns, 1999). We found a statistically significant difference between the non-native English speaking instructor ($M = 0.66$, $SE = 0.059$) and the native English-speaking instructor ($M = 0.42$, $SE = 0.05$) for the amount of self-reported state-trait anxiety students felt, $F(1, 103) = 20.30$, $p < .001$, $\eta^2 = .04$. This finding shows that participants reported feeling more state-trait anxiety when they listened to the non-native English-speaking instructor than the native English-speaking instructor.

We hypothesized that individuals with more experience with Chinese-accented English would experience less state-trait anxiety than those not experienced in this domain. To test this, we separated participants into two groups: high experience ($n = 38$) and low experience ($n = 66$; McGowan, 2015a, 2015b). Similar to Experiment 1, participants with three or more aggregate scores on the Chinese language experience scale were classified as having high experience (McGowan 2015a, 2015b).

We conducted a repeated-measures ANOVA to test for self-reported state-trait anxiety levels based on participants' language experience. There was a statistically significant main effect of instructor type, $F(1, 102) = 13.59$, $p < .001$, $\eta^2 = .02$. Similar to the results from the Language Listening Anxiety Scale (Kimura, 2008) in Experiment 1, there was no main effect for language experience that was observed, $F(1, 102) = 0.06$, $p = .814$, $\eta^2 = 0$. There was a statistically significant interaction between instructor type (native English speaker vs. non-native English speaker) and participants' experience with Chinese-accented English, $F(1, 1) = 9.50$, $p = .003$, $\eta^2 = 0.02$. The interaction indicated that participants with high experience with Chinese-accented English had similar levels of self-reported state-trait anxiety for both native English-speaking ($M = 0.50$, $SE = 0.08$) and non-native English-speaking ($M = 0.53$, $SE = 0.10$) instructors. On the other hand, participants with low experience with Chinese-accented English had higher levels of self-reported state-trait anxiety for the non-native English-speaking instructor ($M = 0.69$, $SE = 0.07$) than they did for the native English-speaking instructor ($M = 0.38$, $SE = 0.06$).

Our findings from Experiment 2's state-trait anxiety mirrored the language anxiety findings from Experiment 1. This meant that participants experienced a general sense of anxiety and stress in the test-like condition of the current study and not just anxiety about language exposure. Participants might have experienced state-trait anxiety as a result of worrying about their recall performance. Similar to Experiment 1, participants with high experience likely did not encounter cognitive overload and reported similar anxiety levels regardless of the instructor

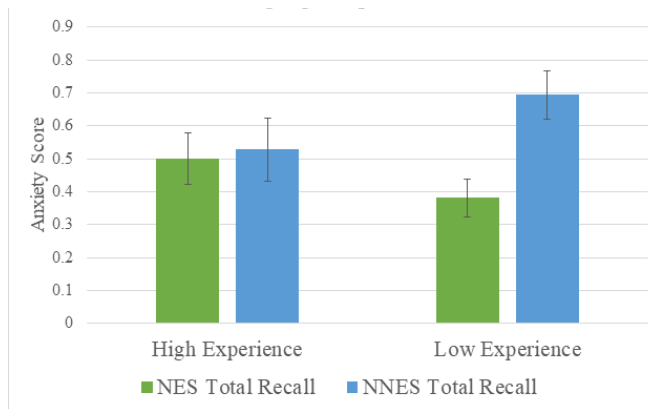
type. Participants who were identified as having low experience of Chinese language likely experienced cognitive overload and increased anxiety due to their attempts to decode the non-native English-speaking instructor's speech.

The current findings on state-trait anxiety might help explain the phenomenon where students tend to rate non-native English-speaking instructors as less competent teachers (Alberts, 2008; Rubin, 1992, 1998; Subtirelu, 2015; Villarreal, 2013). When participants experience a general state of anxiety, they might misattribute their anxiety to the instructor's teaching ability instead of their own difficulty in decoding the non-native English-speaking instructor's speech patterns. In other words, participants might be more prone to explain their general anxiety as the direct result of the non-native English-speaking instructor's inability to teach.

General Discussion

The current study found that participants experienced less anxiety and better memory recall when watching PIP lecture videos with the native English-speaking instructor than they did with the non-native English-speaking instructor. When we divided participants into high and low experience groups, we found that the high experience participants had similar anxiety levels for both instructors and better memory recall with the non-native English-speaking instructor. Low experience participants, however, experienced the opposite effect: they had more anxiety and worse recall with the non-native English-speaking instructor.

Figure 4. *Burns Anxiety Inventory (Burns, 1999) Averages with Language Experience*



Note. Participants with high experience listening to Chinese-accented English felt similar state-trait anxiety with both instructors. Participants with low experience listening to Chinese-accented English felt significantly more state-trait anxiety with the non-native English-speaking (NNES) instructor than with the native English-speaking (NES) instructor.

Participants' Self-Reported Anxiety Levels

In the current study, we focused on the test anxiety that participants experienced. Test anxiety is commonly thought of as 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). The current study measured test anxiety by capturing learners' language listening anxiety and their state-trait anxiety across two experiments. Findings related to anxiety were consistent across the two experiments.

We found that participants experienced higher state and language anxiety levels when listening to the non-native-English-speaking instructor than when they listened to the native English-speaking instructor. As previously shown, native English-speaking individuals' primary focus while in conversation with non-native English-speaking individuals is on understanding what they are saying instead of intaking the content information (Grey et al., 2019; Mayer et al., 2003; Morris & Chen, 2020, 2021; Paas et al., 2010; Sweller, 1994, 2010; Sweller & Chandler, 1991; Sweller et al., 2019). Focusing on understanding the speaker's speech pattern and accent instead of focusing on encoding the content of the information can cause learners to experience cognitive overload (Morris & Chen, 2021). Feng et al. (2021) found that when an individual is experiencing cognitive overload, they have more difficulties with language perception, such that their ability to identify pitch shifts, tone identification, and word discrimination is compromised. This can lead to more anxiety in recall situations because learners are aware that they did not properly encode 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 in Chinese-accented English had similar self-reported anxiety levels for both non-native and native English-speaking instructors in both experiments. Participants with high Chinese-accented English experience were likely more efficient at processing the information from the non-native English-speaking instructor. The greater processing efficiency helps prevent participants' cognitive threshold from being surpassed (Morris & Chen, 2020, 2021). On the other hand, participants in the low experience group in both experiments experienced more anxiety with the non-native English-speaking instructor, likely because participants' cognitive threshold was surpassed.

Participants' Recall Performance

For the recall performance, participants experienced worse memory recall when the non-native English-speaking instructor presented information. Our results indicated that participants were experiencing higher anxiety levels, likely due to cognitive overload when listening to the non-native English-speaking in-

structor. Furthermore, test anxiety likely also hindered participants' recall performance, based on ideas discussed in the previous section (Arkin et al., 1982; Comunian, 1993; Kurosawa & Harackiewicz, 1995; Sarason, 1984; Sarason & Sarason, 1981; Sarason & Sarason, 1987). Together, test anxiety and cognitive overload caused participants to be more focused on the non-native-English-speaking instructor's accent and speech pattern than encoding the content 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). Poorer information encoding would, in turn, lead to worse recall performance.

When we divided the participants into the high and low experience groups, we found that those in the high experience group had better total recall with the non-native English-speaking instructor. In comparison, those in the low experience group had better total recall with the native English-speaking instructor. Previous research has found that higher cognitive effort leads to enhanced information encoding and better memory recall (Morris & Chen, 2020). The observed better recall was likely due to increased cognitive effort from the learners and more cognitive resources dedicated to encoding content information instead of decoding accent or speech pattern (Mayer et al., 2003; Morris & Chen, 2020; Paas et al., 2010; Sweller, 1994; Sweller, 2010; Sweller & Chandler, 1991; Sweller et al., 2019). High experience group participants also indicated that they did not experience elevated anxiety levels while listening to the non-native English-speaking instructor, indicating they had adequate cognitive resources to process the content information.

The low experience group, on the other hand, likely experienced cognitive overload because additional cognitive resources had to be allocated to understanding the speech pattern of the non-native-English speaking instructor (Ahn, 2010; Broadbent & Fuller-Tyszkiewicz, 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 daily tasks. Competition for cognitive resources can occur when this process is paired with additional demand for accent interpretation (Feng et al., 2021). This competition can result in a diminished ability to properly process speech (Feng et al., 2021; Hunter & Pisoni, 2018; Wurm & Samuel, 1997). In this instance, low experience participants' working memory resources were likely dedicated to decoding the accent and speech pattern of the non-native-English-speaking instructor, and fewer cognitive resources were left to encode the content 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). Low experience group participants also indicated higher anxiety levels while listening to the non-native English-speaking instructor. The increased anxiety, manifested in the form of heightened emotional response and worry, could further reduce cognitive resources (Arkin et al., 1982; Comunian, 1993; Kurosawa & Harackiewicz, 1995; Sarason, 1984; Sarason & Sarason, 1981; Sarason & Sarason, 1987).

Limitations

There were several limitations to the current study. First, we did not account for any visual priming cues that could have been presented within the instructors' face cameras. Though the two instructors' videos were as similar as possible, subtle priming cues were present. Minor differences such as the non-native English-speaking instructor wearing glasses and the native English-speaking 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 (Montgomery & Zhang, 2018). The effect of these subtle differences is likely minimal due to the camera stream being a small sub-frame in the bottom right corner of the screen. The facial cues were primarily intended to provide participants with knowledge of the instructors' race. This is part of our manipulation and reinforces the idea of accents and non-native English-speaking individuals in general.

Second, we did not include self-perception measures, including cognitive load and stereotype measures. Including a cognitive load measure 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 that is more applicable to the classroom. As for stereotypes, it is possible that stereotypes could be a moderating factor (Fiske et al., 2018; Goodwin et al., 2014). Future replications of the current study could include these self-perception measures in their design.

Third, the study has limitations in its sample method. Our sample size was relatively small despite the power analysis. We also recruited participants from the same state university, and most of our participants came from the rural Midwestern region of the United States.

Fourth, McGowan (2015a, 2015b) did not report a reliability analysis for the Chinese language experience scale. We also followed McGowan's strategy in converting a continuous measure to a categorical variable with two levels. When a continuous variable is converted into a categorical variable with unequal groups, power is lost in the analysis as power is based on the smaller group in the comparison. Some of the practices by McGowan could have been due to disciplinary differences. Future studies could focus on re-examining the scale's reliability and analyzing the language experience variable as a continuous variable.

Implications and Future Directions

The current study has multiple educational implications. Non-native English-speaking instructors may use this information to inform how they design their lecture videos. More importantly, however, this indicates that educational systems could take extra steps to acquaint native English-speaking students with

non-native English-speaking individuals' speech patterns. More non-native English-speaking individuals are becoming part of the business and educational worlds in prominently English-speaking areas (Furuya et al., 2019). A study conducted by Furuya et al. (2019) found that approximately 22% of post-secondary education instructors in the United States are foreign-born. Specifically, 17% were from China, 12% from India, and 5% from Korea. Requiring language courses or cross-cultural courses could benefit both parties, as multilanguage experience could potentially reduce the anxiety of a native English-speaking learner with a non-native English-speaking instructor.

Using methods of the intergroup contact theory could also serve as a starting basis for native English-speaking students to become familiar with these differences (Allport, 1954, 1958; Pettigrew, 2021; Pettigrew & Tropp, 2006). The main idea of the theory is that if contact between two differing groups occurs in reasonably favorable conditions, the levels of prejudice could be reduced (Allport, 1954, 1958; Pettigrew, 2021; Pettigrew & Tropp, 2006). Pettigrew (2021) stated that four fundamental factors can lead to this prejudice reduction: "(a) equal status between the groups within the situation, (b) common goals, (c) cooperation between the groups, and (d) authority sanction for the contact" (p. 262). Most of these factors can be present inside and outside educational settings to help familiarize native English-speaking students with accented English. For example, non-native English-speaking students and native English-speaking students could be intentionally paired together to complete group assignments. Outside of the classroom, parents can be encouraged to take their children to multicultural events where they can be exposed to different cultures, accents, and speech patterns. A comprehensive review of the intergroup contact theory is beyond the scope of the current paper, but future studies could incorporate this theory into their designs.

Future studies could focus on expanding to other accents aside from Chinese. It could serve to see if English accents from other countries, such as Nigeria or Belize, replicate similar findings. Future studies could also expand upon the current research by comparing the effects of student anxiety with a non-native English-speaking instructor in an in-person setting versus an online setting.

Conflict of Interest Disclosure

The Authors have no relevant financial or non-financial interests to disclose.

Funding

No funding was received for conducting this study.

Research Ethics Statement

The current study received ethical approval (Eastern Kentucky University, IRB #4350).

Data Availability Statement

The datasets generated during and/or analyzed during the current study are available in the OSF repository (<https://osf.io/6hnbr/>).

Authorship Details

Katelyn Lee McClure: research concept and design, collection and/or assembly of data, data analysis and interpretation, writing the article, critical revision of the article, final approval of the article. Hung-Tao Michael Chen: research concept and design, data analysis and interpretation, writing the article, critical revision of the article, final approval of the article.

References

- 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* [Doctoral dissertation, Ohio University]. OhioLINK Electronic Theses and Dissertations Center. http://rave.ohiolink.edu/etdc/view?acc_num=ohiou1282580640
- Alberts, H. C. (2008). The challenges and opportunities of foreign-born instructors in the classroom. *Journal of Geography in Higher Education*, 32(2), 189–203. <https://doi.org/10.1080/03098260701731306>
- Allport, G.W. (1954) *The nature of prejudice*. Addison-Wesley.
- Allport, G.W. (1958) *The nature of prejudice*. Doubleday Anchor.
- 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). 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.
- 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>
- Burns, D. D. (1989). *Burns Anxiety Inventory (Burns AI)* [Database record]. APA PsycTests. <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). 1181–1185. <https://doi.org/10.1177/1071181320641282>
- Chen, C-M., & Wu, C-H. (2015). Effects of different video lecture types on sustained attention, emotion, cognitive load, and learning performance. *Computers & Education*, 80, 108–121. <http://dx.doi.org/10.1016/j.compedu.2014.08.015>
- 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>
- 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>
- Endler, N. S., Kantor, L., & Parker, J. D. A. (1994). State-trait coping, trait anxiety and academic performance. *Personality and Individual Differences*, 16(5), 663–670. [https://doi.org/10.1016/0191-8869\(94\)90208-9](https://doi.org/10.1016/0191-8869(94)90208-9)
- Engström, J., Markkula, G., Victor, T., & Merat, N. (2017). Effects of cognitive load on driving performance: The cognitive control hypothesis. *Human Factors*, 59(5), 734–764. <https://doi.org/10.1177/0018720817690639>
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41(4), 1149–1160. <https://doi.org/10.3758/BRM.41.4.1149>
- 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
- Fiske, S. T., Cuddy, A. J. C., Glick, P., & Xu, J. (2002). A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. *Journal of Personality and Social Psychology*, 82(6), 878–902. <https://doi.org/10.1037/0022-3514.82.6.878>
- Furuya, Y., Nooraddini, M. I., Wang, W., & Waslin, M. (2019). *A portrait of foreign-born teachers in the United States*. George Mason University Institute for Immigration Research.
- Grey, S., Cosgrove, A. L., & van Hell, J. G. (2020). Faces with foreign accents: An event-related potential study of accented sentence comprehension. *Neuropsychologia*, 147, 107575. <https://doi.org/10.1016/j.neuropsychologia.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). Sage.
- Goodwin, G. P., Piazza, J., & Rozin, P. (2014). Moral character predominates in person perception and evaluation. *Journal of Personality and Social Psychology*, 106(1), 148–168. <https://doi.org/10.1037/a0034726>

- Guo, P. J., Kim, J., & Rubin, R. (2014). How video production affects student engagement: An empirical study of MOOC videos. *Proceedings of the First ACM Conference on Learning @ Scale Conference* (pp. 41–50). <https://doi.org/10.1145/2556325.2566239>
- Hammer, M. R., Wiseman, R. L., Rasmussen, J. L., & Bruschke, 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>
- 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>
- Illoudi, C., Giannakos, M. N., & Chorianopoulos, K. (2013). Investigating differences among the commonly used video lecture styles. In *WAVE 2013 the workshop on Analytics on video-based learning* (pp. 21–26).
- 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>
- Kokoç, M., Ilgaz, H., & Altun, A. (2020). Effects of sustained attention and video lecture types on learning performances. *Education Technology Research and Development*, 68, 3015–3039. <https://doi.org/10.1007/s11423-020-09829-7>
- 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>
- Lantolf, J. P. (1990). A time to speak: A psycholinguistic inquiry into the critical period of human speech. *Studies in Second Language Acquisition*, 12(1), 84–85. <https://doi.org/10.1017/S0272263100008779>

- Mayer, R. E. (2005). Cognitive theory of Multimedia Learning. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (pp. 31–48). Cambridge University Press. <https://doi.org/10.1017/CBO9780511816819.004>
- Mayer, R. E. (2009). *Multimedia learning* (2nd ed.). 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>
- 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 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>
- Moreno, R., & Mayer, R. E. (1999). Cognitive principles of multimedia learning: The role of modality and contiguity. *Journal of Educational Psychology*, 91(2), 358–368. <https://doi.org/10.1037/0022-0663.91.2.358>
- 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), 490–494. <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>
- Munro, M. J., & Derwing, T. M. (1995). Processing time, accent, and comprehensibility in the perception of native and foreign-accented speech. *Language and Speech*, 38(3), 289–306. <https://doi.org/10.1177/002383099503800305>
- Ortega, L. (2009). *Understanding second language acquisition*. Taylor & Francis. <https://doi.org/10.4324/9780203777282>
- 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://doi.org/10.1007/s10648-010-9133-8>
- Pettigrew, T. F. (2021). Advancing intergroup contact theory: Comment's on the issue's articles. *Journal of Social Issues*, 77(1), 258–273. <https://doi.org/10.1111/josi.12423>
- Pettigrew, T. F., & Tropp, L. R. (2006). A meta-analytic test of intergroup con-

- tact theory. *Journal of Personality and Social Psychology*, 90(5), 751–783. <https://doi.org/10.1037/0022-3514.90.5.751>
- 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>
- Rubin, D. L. (1998). Help! My professor (or doctor or boss) doesn't talk English. In J. Martin, T. Nakayama, & L. Flores (Eds.), *Readings in cultural contexts* (pp. 149–159). Mayfield.
- Sadik, A. (2016). Students' preferences for types of video lectures: Lecture capture vs. screencasting recordings. *Journal of Educational Multimedia and Hypermedia*, 25(2), 189–208. <http://dx.doi.org/10.5430/ijhe.v4n4p94>
- 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*. Lawrence Erlbaum Associates.
- Sarason, I. G., & Sarason, 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* (pp. 55–66). Swets & Zeitlinger.
- 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.
- Scovel, T. (2000). A critical review of the critical period research. *Annual Review of Applied Linguistics*, 20, 213–233. <https://doi.org/10.1017/S02671905000200135>
- 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>
- Schneider, S., Beege, M., Nebel, S., & Rey G. D. (2018). A meta-analysis of how signaling affects learning with media. *Educational Research Review*, 23, 1–24. <https://doi.org/10.1016/j.edurev.2017.11.001>
- 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. <http://dx.doi.org/10.1017/S0047404514000736>
- 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
- 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>
- 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>
- Villarreal, D. (2013). Closing the communication gap between undergraduates and international faculty. *CATESOL Journal*, 24(1), 8–28.
- Wang, J., & Antoneko, J. (2017). Instructor presence in instructional video: Effects on visual attention, recall, and perceived learning. *Computers in Human Behavior*, 71, 79–89. <https://doi.org/10.1016/j.chb.2017.01.049>
- 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>
- Yi, H-G., Phelps, J. E. B., Smiljanic, R., & Chandrasekaran, B. (2013). Reduced efficiency of audiovisual integration for nonnative speech. *The Journal of the Acoustical Society of America*, 134, 387–393. <https://doi.org/10.1121/1.4822320>
- Yi, H-G., Smiljanic, R., & Chandrasekaran, B. (2014). The neural processing of foreign-accented speech and its relationship to listener bias. *Frontiers in Human Neuroscience*, 8, 1–12. <https://doi.org/10.3389/fnhum.2014.00768>

Appendix A

Kimura's (2008) Foreign Language Listening Anxiety scale

- 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's (2015a, 2015b) 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 accent.

Appendix C

The Burns Anxiety Inventory (Burns, 1999)

- a. Anxiety, Nervousness, Worry, Fear
- b. Feeling tensed, stressed, "uptight," or on edge
- c. Difficulty concentrating
- d. Racing thoughts or your mind jumping from one thing to the next
- e. Concerns of looking foolish or inadequate in front of others
- f. Fears of criticism or disapproval
- g. Butterflies or discomfort in the stomach
- h. Tight, tense muscles