THE PENNSYLVANIA STATE UNIVERSITY
SCHREYER HONORS COLLEGE

DEPARTMENT OF PSYCHOLOGY

THE INFLUENCE OF SPEAKERS' PHYSICAL APPEARANCE ON LISTENERS' ACCENTED SPEECH COMPREHENSION

CARLY DANIELSON
FALL 2019

A thesis
submitted in partial fulfillment
of the requirements
for baccalaureate degrees
in Psychology and Letters, Arts, and Sciences
with honors in Psychology

Reviewed and approved* by the following:

Janet Van Hell
Professor of Psychology and Linguistics
Thesis Supervisor

Richard Carlson
Professor of Psychology
Honors Adviser

* Signatures are on file in the Schreyer Honors College.

ABSTRACT

As the levels of intercultural communication and negotiation rapidly increase, an increasing number of people now speak English as a second language, many of whom speak English with a foreign accent. Research demonstrates that comprehending foreign-accented speech tends to be more effortful than comprehending native-accented speech (for a review, see Cristia, Seidl, Vaughn, Schmale, Bradlow, & Floccia, 2012). Previous research has mostly presented speech in isolation. However, it is unknown how a speaker's facial appearance, cuing speaker identity, influences listeners' speech comprehension and their perception of whether the speaker has a native or foreign accent. Facial/physical appearance possibly creates language expectations and may allow for erroneous perception that a speaker has a foreign accent because the speaker physically appears "foreign", even if this speaker actually has a native accent. Through two experiments, one conducted at Penn State, and the second at Beijing Normal University in Beijing, China, I sought to examine how faces cuing the speaker's identity create language expectations about speech, and the impact this has on the comprehension of American-accented and Chinese-accented English. At Penn State, White American monolinguals, and at Beijing Normal University, Chinese native English L2-speakers listened to American-accented and Chinese-accented English sentences. The spoken sentences were preceded by a picture of an Asian face or a White face, which yielded two congruent face-accent conditions (White Face/American Accent; Asian Face/Chinese Accent) and two incongruent face-accent conditions (Asian Face/American Accent; White Face/Chinese Accent). Immediately after hearing the sentence, listeners transcribed the sentence. English monolinguals' American-accented sentence transcription accuracy was lower when preceded by an Asian face than when preceded by a

White face. For Chinese-accented sentences, transcription accuracy did not differ for White and Asian faces. This indicates that faces cuing ethnicity only trick our ears in native-accented, but not in foreign-accented speech. The results are interpreted in terms of Reverse Linguistic Stereotyping (RLS) and accent-driven asymmetries in face-accent processing.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGEMENTS

I would like to extend my deepest thanks to Dr. Janet Van hell, for her vital support and much needed guidance. Without your advice and knowledge, this work that I value deeply would not have been possible. Thank you for your endless belief in me and my ideas, and for helping me in working for the means to conduct this research, explore my interests, and travel abroad to make this all possible. I have enjoyed all of the time spent in the Bilingualism and Language Development Lab, am so grateful for all of the individuals I've met along the way. I am so thankful to have met them; their kindness and intellect is very important to me. They motivated me to work hard and have confidence in my abilities. Especially Carla Fernandez, Eric Pelzl, and Gloria Xu, who encouraged me when I felt deterred, and inspired me to do my best work always. Thank you for your expertise, encouraging advice, and friendship.

I would also like to thank Dr. Taomei Guo, for both welcoming me as a valuable individual in the research lab while abroad and teaching me valuable lessons through exciting and intriguing conversations. Your kindheartedness means the world to me.

Additionally, I would like to thank my honors advisor, Dr. Richard Carlson, for supporting and reading my research project. Thank you for being so reassuring through the times when I had endless lists of questions; for enriching my experience as a part of the honors college.

I wish to finally thank my family, who stood by me and understood me throughout this endeavor. I am so lucky that you have always believed in me and my goals. Much of what I am is because of what you saw I could be. Thank you for pushing me to fight for what I believe in and for encouraging me to express my creativity and individuality in all that I do.

The research in this thesis is supported by NSF grant OISE-1545900.

Chapter 1 Introduction

"You can never understand one language until you understand at least two."

- Geoffrey Willans

Background

If one spends an extended amount of time on a college or university campus, they'd be very likely to gain insight on what students think of their professors. Students might talk about the professor's teaching style, the materials they use to instruct, or perhaps just what they think of the professor as a whole. They might bring up the professor's nonverbal communication, like their body posture and gestures, their voice, and perhaps, their "accent". The latter of these subjects may be spoken of in terms of having a "negative influence" on the students' "educational experience", meaning that the professor has a regional dialect, or more likely a "foreign accent" that makes it difficult to understand their spoken communication.

Across large campuses, it is very common to learn that the instructors originate from a wide variety of countries and themselves may carry along with them the knowledge of multiple languages. Though one would think nothing of this at first, it soon becomes a relevant topic to pursue, because of the implications. Students may complain about their professors, in terms of their inability to understand the professor. Listeners exposed to different types of accented speech have been shown to be faster and better in comprehending foreign-accented speech, conveying the idea that with experience comes knowledge and competence, what may be written

off as an “impossible-to-comprehend” professor might actually just be a professor with a “foreign” name and physical appearance, who while having a foreign accent, may find her/himself further misunderstood simply because of how she/he appears. This striking observation opens the floor for a wide variety of questioning involving speakers, their physical appearance, and the combined influence on resulting speech comprehension. For example, if a person believes a speaker has an accented speech form they are not used to, we may be interested in finding out if they will be slower and face greater difficulty in speech comprehension, even if the speaker does not actually demonstrate an accent unfamiliar to the listener. Thus, comes the question at hand and the topic of my thesis: how might speakers’ physical appearance affect listeners’ comprehension of foreign- and native-accented speech?

A World Requiring Effective Communication

While in an increasingly globalized world, it becomes more likely that humans will spend every day participating in intercultural communication to some extent. With this, comes the possibility that the speakers we encounter know multiple languages, that English is not their first language, and/or that they have a foreign accent in English. A growing number of people from different countries are spending time learning second languages, and with learning a second language comes the presence of a foreign accent. When students discuss accent, they may think that those who sound “different” from them have a “foreign accent”, while they themselves have no accent at all. However, the truth is that all speakers of any language have an accent, some native and some foreign, and no two people speak and communicate in the exact same way. There should be a clear distinction made between dialect and accent. While accent refers to how

individuals pronounce words, dialect includes all-encompassing realms of communication, including grammar, vocabulary, and pronunciation. To add, Dialect tends to be used in terms of discussing one's mother tongue, while accent tends to capture how someone speaks another language.

While there are 360 million speakers of English as a first language (Nelson & Greenbaum, 2016), there are also 611 million speakers of English as a second language (Simons & Fennig, 2017). Thus, it is likely we will meet and communicate with individuals of different ethnic backgrounds, who may or may not speak English with a foreign accent. Ken Tanaka and David Neptune recently launched a series of videos in which Asian-Americans speaking American-accented English describe how they are often confronted with people being confused about their speaker identity, and who are expecting them to speak English with a Chinese accent. These experiences illustrate that humans rely upon physical appearance, and utilize physical appearance (e.g., one's face) to predict speech characteristics. Understanding how physical (face) appearance influences the comprehension of speech provides new insight into ethnicity-based biases and can potentially identify effective ways to manage and minimize this bias during speech comprehension. This reinforcing the question: how do listeners process foreign-accented and native-accented speech, and moreover, how does a speakers' identity (including race and ethnicity) affect the comprehension of foreign-accented and native-accented speech?

Previous Research

Research on speaker identity as an influence on listeners' accent detection ability and speech comprehension has largely been conducted independent of the study on foreign-accent

speech processing. However, research that has addressed a combination of or perhaps a subset of this research topic is outlined below. Some previous studies have investigated how facial cues in regard to speaker identity influence speech perception, while other studies have studied foreign- and native-accented speech comprehension in the absence of visual cues.

Although previous research has addressed these overarching topics, most of the research done on this subject has emphasized this influence in the context of monolingual English speakers and native-accented speech. While this line of research is relevant, it is not the only communication environment experienced in real-world scenarios. Thus, it is imperative that we look at multicultural contexts and foreign-accented speech, not only to see where these environments are similar, but also to begin to understand how they and the people within them might differ in regard to the influence of physical appearance on speech comprehension.

Moreover, although foreign-accented speech has long since been a research topic in the fields of linguistics and psycholinguistics, research on the comprehension of foreign-accented speech often presented speech in the absence of visual cues related to the speaker's appearance, meaning most studies presented speech in isolation. Psychological research has found that humans use visual cues/features, such as an individual's face, to deduce what they expect to hear (Cristia, Seidl, Vaughn, Schmale, Bradlow, & Floccia, 2012). This in turn could mean perceiving an accent where none exists, and vice versa, as suggested within the research discussed below (Kang and Rubin 2009). This suggests that it is possible that humans create the perception that they will hear foreign-accented speech because the individual speaking physically appears "foreign", even if this speak does not have a foreign accent. Not just this, but previous research has shown that comprehending foreign-accented speech tends to be more effortful than comprehending non-accented speech (for a review, see Cristia et al., 2012). This conveys the

possibility that there are different processing and reaction times for listeners depending on the accent of the speaker they are currently listening to, and that if they do predict foreign accent by the speaker they are watching, they might even be making it harder than it realistically is to process that individual's language.

Processing of Foreign-Accented and Native-Accented Speech

Clarke and Garrett (2004) studied processing difficulty of foreign-accented English speech, in comparison to native-accented English speech. They had native English speakers, who were neither fluent in Spanish nor Chinese listen to Spanish-accented speakers (Experiments 1 and 2) and Chinese-accented speakers (Experiment 3) of English. They were told to read a probe word, which may or may not have been present in the sentence, after hearing each sentence. They were asked to determine whether they had heard this word within the sentence or not. Accuracy and reaction time to probe words were measured, and helped account for processing difficulty, as a higher reaction time and lower accuracy indicated higher difficulty. They found that processing of non-native speech was more difficult at first. When acoustic and phonetic signals deviate from expected ones based on physical (face) appearance, less of the produced speech is comprehended, and what is comprehended requires larger amounts of effort. However, in this study, participants quickly adapted, and within one minute of exposure, the difficulty attenuated. Thus, even when dealing with phonologically unfamiliar speech, individuals are quickly able to adapt and modify their comprehension abilities to afford the communication environment so they can converse with greater effectiveness and accuracy.

Baese-Berk, Bradlow, and Wright (2013) studied transcription accuracy of English sentences spoken in five different foreign accents using transcription accuracy as a measure. They compared their findings to those of Bradlow and Bent (2008) who studied native-accented speech versus a single foreign accent using the same paradigm. The combined findings of these studies showed that listeners are generally faster and better in comprehending native-accented than foreign-accented speech, but listeners who are exposed to different types of foreign-accented speech were faster and better in comprehending foreign-accented speech than listeners who were exposed to only one type of foreign-accented speech. This indicates a relationship between language experience and accented speech comprehension, where listeners who are exposed to multiple accents more successfully process and comprehend speech from novel speakers with novel accents. These experienced listeners seem to experience reduced speech processing costs that listeners with less accent exposure do not experience.

Previous Studies on Facial Cues of Speaker Identity and Speech Perception

Rubin (1992) serves as a pivotal study on the effect of speaker (physical/facial) identity on language comprehension. Undergraduates students were presented with native-accented English speech, paired with either a White or an Asian face. The study found that participants reported perceiving foreign accent when the recordings were paired with a picture of an Asian woman. Furthermore, they performed worse on the comprehension questions about the recordings when the recordings were paired with the picture of the Asian woman relative to the White woman.

Kang and Rubin (2009) introduced the term Reverse Linguistic Stereotyping (RLS), the idea that listeners attach stereotyped characteristics to, and therefore distorted evaluations of, speech solely based on information they have gained about the speaker's identity/visual appearance. RLS further states that such listener-created biases, in regard to what they expect to hear, develop before the speech is actually heard. In Kang and Rubin's study, participants listened to lectures recorded in native-accented English. The lectures were accompanied with either an Asian or a White male's picture. Participants inclined to assign a particular accent to the male speakers depending on their physical appearance tended to rate the speaker as having a stronger accent and being a less efficient teacher when the recording was paired with an Asian face. This indicates that listeners making preconceptions how a speaker's speech will sound like based on how they appear, and these identity-cued attributions influence speech comprehension but also listeners' evaluations of the speaker's teaching qualities.

McGowan (2015) conducted an experiment using Chinese-accented English sentences in which native English listeners with high and low experience with Chinese-accented English listened to and transcribed these sentences. Sentences were either paired with a picture of a Chinese speaker, a White speaker, or with a blank screen. They found that accuracy of comprehending Chinese-accented speech increased when the accented speech was shown with a picture of a Chinese individual. This demonstrates that visual cues in the form of pictures aid in the ability to successfully comprehend speech, perhaps giving clues about what to expect. These clues are helpful in this scenario because the presumptions and expectations match the reality, but that tends to not be the case. Visual cues can create language expectations that are instead detrimental to the actual comprehension: listeners "saw" accent, where it is not actually present in speech, and rated those individuals they perceived to have accents as less intelligent and less

fluent. (Babel and Russel 2015). Specifically, they studied perceived intelligibility and accentedness, along with comprehension of Canadian-accented English sentences in Chinese-Canadians and White-Canadians. The speech was presented in three possible conditions: with a picture of a Chinese-Canadian speaker or White-Canadian speaker, or without a picture at all (baseline condition to measure faces as a primer for speech processing). The transcriptions were overall accurate in all conditions, which does not provide support for RLS. However, all participants (both Chinese-Canadians and White-Canadians) rated the speaker's intelligibility scores as lower when the sentences were presented with a Chinese-Canadian speaker's picture. In terms of accentedness, only White-Canadians and not Chinese-Canadians, reported hearing a stronger accent when sentences were paired with a Chinese-Canadian Speaker's picture. This demonstrates that the White-Canadians were more likely to engage in RLS. These studies together uphold the RLS hypothesis that facial cues/physical appearance can impact speech perception in regard to accentedness and intelligibility. With this, it is revealed that listener background may also play a role in moderating the likelihood that a listener will participate in RLS. This suggests that listeners create language expectations based on speakers' physical appearance/facial cues, where speech comprehension and intelligibility are impaired in incongruent face (related to perceived race/ethnicity)-accent circumstances, and enhanced where face and accent are perceived as congruent. This is also modulated by listeners' background, which may involve said listeners' previous language experience as a modulating experience variable.

Present Study

As previous research on the influence of visual cues on speech comprehension in terms of determining accent is limited, we sought to examine how visual cues in regard to a speaker's ethnicity (e.g. Asian face versus White face), create language expectations in listeners (e.g. listeners expect to hear Chinese-accented English after viewing an Asian face), and furthermore how these biases impact the comprehension of American- and Chinese-accented English. A goal of the research was to both combine accent detection and foreign-accented speech comprehension and to expand upon this field of research by adding the presentation of a visual cue (speakers' picture) to assess for the presence of reverse linguistic stereotyping (RLS) using a manipulation that previous studies have not. We examined how faces cuing the speaker's ethnicity create expectations about upcoming speech, and how this impacts the comprehension of American- and Chinese-accented English.

There were two overall experiments that took place; the first at Penn State University, under Janet Van Hell, in the Bilingualism and Language Development Laboratory, and the second at Beijing Normal University, under Taomei Guo, at the State Key Laboratory of Cognitive Neuroscience and Learning. Also, two main behavioral experiments were implemented, one being an online reaction time (RT) error detection task, and the other being an offline transcription accuracy task. The transcription task was conducted at Penn State University and Beijing Normal University, whereas the error detection task was only used at Beijing Normal University. In the transcription task, White American monolinguals and Chinese-born Chinese-English bilinguals listened to American-accented and Chinese-accented sentences, preceded by a picture of an Asian face or a White face, yielding two congruent face-accent conditions (White Face-American accent; Asian Face-Chinese accent) and two incongruent face-

accent conditions (Asian Face-American Accent; White Face-Chinese Accent). This task has been used in the field previously by McGowan (2015), Babel and Russell (2015), and Baese-Berk, Bradlow, and Wright (2013). In the error detection task, Chinese-born Chinese-English bilinguals were exposed to the same four conditions, and were asked to both detect possible grammatical and semantic errors in the sentences, as well as answer periodical comprehension questions when prompted.

We predicted that if listeners use facial cues to create expectations about upcoming speech, the speech transcriptions will be less accurate and error detection will be slower for incongruent face-accent combinations (Asian face followed by an American-accented sentence and a White face followed by a Chinese-accented sentence) relative to congruent face-accent combinations. This outcome would align with McGowan (2015)'s transcription task findings, although it remains to be seen whether such effects also emerge in the online error detection task.

If listeners do not use facial cues to create expectations about upcoming speech, performance on incongruent versus congruent face-accent conditions will not be different, and a typical foreign-accented speech effect will be found: performance on American-accented speech will be better than on Chinese-accented speech, irrespective of the facial cue. The study focused on young American and Chinese college-aged individuals; students of universities of which would experience varying types or levels of exposure of communication and interaction with multilingual individuals. More specifically, we recruited Penn State students who reported having little to no experience with Chinese-accented speech, and Beijing Normal University students who, as Chinese-English Bilinguals, had much higher levels of exposure to Chinese-accented English.

Chapter 2 Experiment 1: White Monolingual Native speakers of English (tested at Penn State, USA)

Methods

Participants

Twenty-one undergraduate students participated for psychology course credits. Participants were recruited through Penn State's psychology subject pool. All participants were White, monolingual speakers of English, reported to not have lived in a non-English speaking country for more than two months, and were right-handed. Four participants' data (n=4) were removed from the analyses due to difficulty completing the tasks as designed. The remaining seventeen participants (Mean age = 19.1 years (*SD*=0.83); 10 females, 7 males), successfully completed the task.

Materials

Materials were selected from a set of sentences (*n*=480) created and recorded by Carla Fernandez for the purpose of her electrophysiological study, which was carried out as part of her doctoral dissertation research (Fernandez and Van Hell, 2019). Participants listened to 320 English sentences during one session. Listeners were exposed to four blocks of 80 sentences: 80 sentences had a grammatical error (e.g., 'John went late to bed because she did not have class in the morning'), 80 sentences were grammatically correct counterparts, 80 sentences had a semantic error (e.g., 'John wrote a scientific coconut about pollution last year') and 80 sentences were semantically correct counterparts (for examples, see Table 1). Both groups of correct

sentences were considered the control sentences. Overall, 160 sentences were paired with an incongruent picture of a face (that does not match the accent), and 160 sentences were paired with a congruent picture of a face (that does match the accent); thus, a White or an Asian face was paired with Chinese-accented and American-accented English sentences. The incongruent face-accent conditions included 80 White Face-Chinese Accent pairings and 80 Asian Face-American Accent pairings, and the congruent face-accent conditions included 80 White Face-American Accent pairings and Asian Face-Chinese Accent pairings (for a representation of the detailed pairing conditions, refer to Table 2). Each of the four groups of 80 face-accent pairings contained 20 sentences with a grammatical error, 20 grammatically correct counterparts, 20 sentences with a semantic anomaly, and 20 semantically correct sentences.

	Correct	**Incorrect**
Semantic	John wrote a scientific **article** article about pollution last year.	John wrote a scientific **coconut** About pollution last year.
Grammatical	John went to bed late because **he** did not have class in the morning.	John went to bed late because **she** Did not have class in the morning.

Table 1. Example Sentences

Condition	**Face**	**Accent**
Congruent	White	American
Incongruent	Asian	American
Congruent	Asian	Chinese

Incongruent	White	Chinese

Table 2. List of Experimental Conditions.

The sentences were recorded by four different speakers: two American-accented, and two Chinese-accented. Two speakers were American-accented speakers of English (American-accented congruent and American-accented incongruent), and two speakers were Chinese-accented speakers of English (Chinese-accented incongruent and Chinese-accented congruent). To specify, the congruent conditions were: White Face-American Accent and Asian Face-Chinese Accent, whereas the incongruent conditions were: White Face-Chinese Accent, and Asian Face-American Accent.

Critical word duration was matched for all speakers. The faces (Asian or White) were presented 350 ms prior to the sentence onset, and remained on the screen for the length of the sentence, one face per sentence. (For an overview of mean sentence duration of sentences and critical words across speakers, see Table 3).

Speaker	**Sentence Duration**		**Critical Word Duration**	
	Semantic	**Grammatical**	**Semantic**	**Grammatical**
(American-accented)	3.05 (0.53)	2.85 (0.38)	0.33 (0.14)	0.14 (0.03)
(American-accented)	3.10 (0.59)	2.92 (0.39)	0.36 (0.13)	0.18 (0.09)
(Chinese-accented)	4.65 (0.94)	4.28 (0.63)	0.39 (0.16)	0.20 (0.07)
(Chinese-accented)	4.61 (0.97)	4.35 (0.70)	0.40 (0.18)	0.19 (0.09)

Table 3. Mean duration (SD) of sentences (in seconds) and critical words across speakers.

Procedure

Participants listened to English sentences one at a time and transcribed them upon the offset of the sentences. Testing was completed in a single session and lasted about two hours and 45 minutes. After consent, participants completed a language history and background questionnaire before beginning transcription. Following the transcription task, they were asked to complete a debriefing accent identification questionnaire.

Participants were seated at a personal computer workplace in a small, quiet room. They were provided headphones, and used the laptop keyboard to record the sentences as they heard them. All 25 participants were exposed to the 320 sentences as they were randomly distributed across all four conditions. The faces (Asian or White) were presented 350 ms prior to the sentence onset, and remained on the screen for the length of the sentence, one face per sentence. After sentence presentation, they transcribed the sentence using the keyboard.

Before the start of the experiment, participants were given instructions, and then given practice sentences. They were informed that they would be listening to sentences in English, as spoken by four different speakers, and were instructed to write down the sentences exactly as they heard them. Specifically, they were told to wait until a gray box appeared on the screen, after which they could begin typing. They were told that the picture shown was a picture of the speaker, and that they should look at the picture while they listen to the sentence. They were also explained that the sentences were about the speakers' friends. The experiment was run using E-Prime 2.0 Software.

Before the experimental task, participants were given a language history and background questionnaire. Following the experimental task, they were given a debriefing, accent identification survey (Grey & Van Hell, 2017), and were asked questions to examine their

detection of differences between the accents of the speakers. They were instructed to indicate where they believed the speakers are from, and rated the accent strength of each speaker from 1 to 7 (1 meaning no foreign accent, and 7 meaning a very strong foreign accent). They also assessed the ease with which they could comprehend the speech of each speaker on a 1 to 7 scale, with 1 meaning very easy to comprehend, and 7 being very difficult to comprehend.

Results and Discussion

Speaker Country Identification

The debriefing questionnaire, completed by all participants following the transcription task, asked participants to indicate where they believed each speaker was from (open-ended question). Responses were combined to determine what locations the participants chose, and which locations came up most frequently. Figures 1 through 4 summarize the results for each speaker.

Figure 1. Penn State Participants' Country Assignments White Face-American Accent (in percentages)

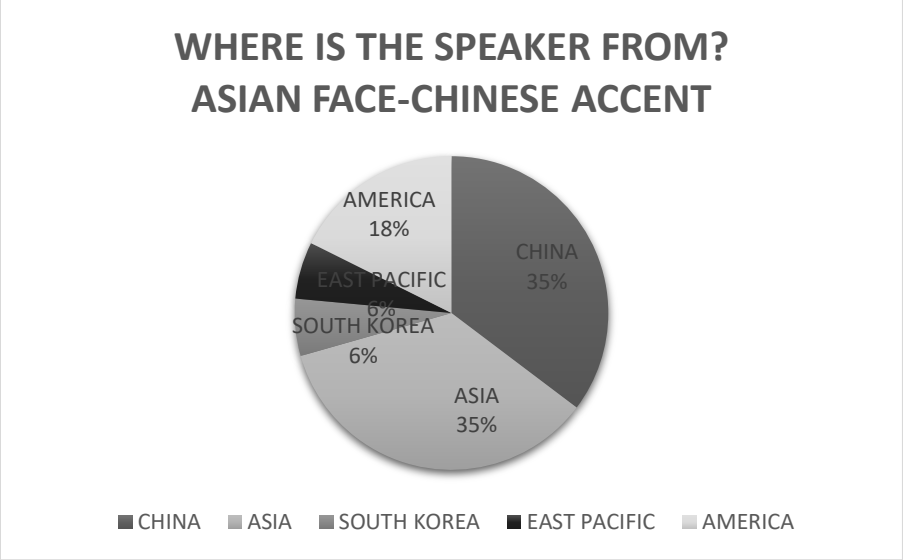

Figure 2. Penn State Participants' Country Assignments for Asian Face-Chinese Accent (in percentages)

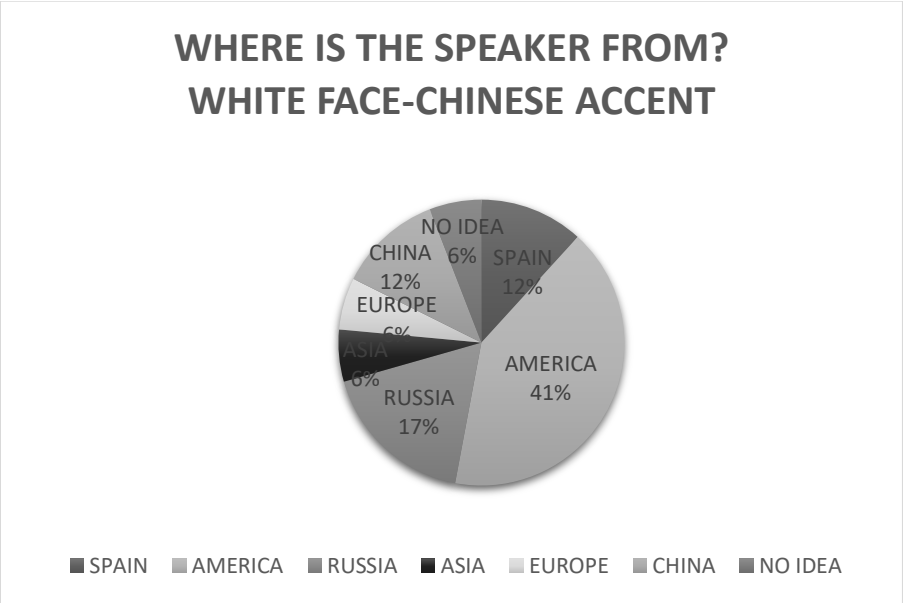

Figure 3. Penn State Participants' Country Assignments for White Face-Chinese Accent (in percentages)

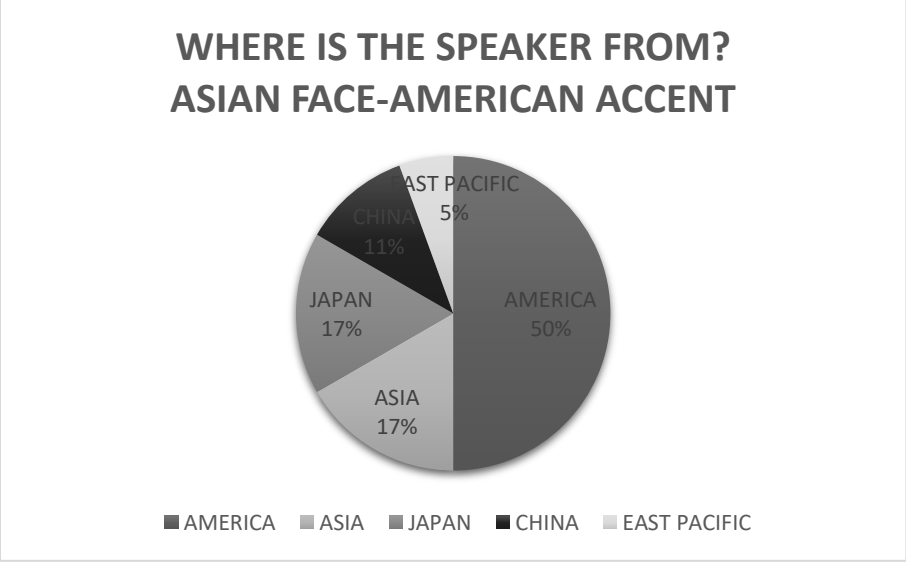

Figure 4. Penn State Participants' Country Assignments for Asian Face-American Accent (in percentages)

Between the four speaker conditions, the Asian Face-American Accent, White Face-American Accent, and White Face-Chinese Accent conditions were reported more as being from America than from any other country or region. 76% of participants indicated that the White Face-American Accent speaker was from America, which was predicted, as this speaker served as the American-accented congruent condition. A smaller percentage of participants rated this speaker as being from a few other countries/continents, including: South America (6%), Spain (12%), and Asia (6%). However, the majority of participants remarked that this speaker is from America.

The speaker described as the Asian Face-Chinese Accent condition was thought to originate from China (35%) or Asia (35%), which was expected, as this speaker was the Chinese-accented congruent condition. 6% of participants reported this Speaker is from South Korea, another 6% said East Pacific, and the remaining 18% reported America. Importantly, participants' ratings of the origin of the two congruent speakers was highly similar (White Face-American Accent from America: 76%; Asian Face-Chinese Accent from Asia/China/South Korea: 76%).

The White Face-Chinese Accent speaker (incongruent condition) was met with much smaller percentages of participants rating the same locations, and overall a greater number of locations were used to respond. The majority of participants (41%) reported that speaker is from America, while the remaining participants either reported Russia (17%), Asia (6%), China (12%), Spain (12%), Europe (6%), and one participant reported they were unsure. This participant served as the Chinese-accented incongruent condition, and the incongruent face-accent pairing led to a wider variety of responses, with some participants basing their response

on facial features (with some then incorrectly assessing the speaker's accent, e.g., Russian) and some participants basing their response on accent.

Finally, the Asian Face-American Accent speaker (incongruent condition) was perceived by 50% of participants as being from America. The remaining participants reported the following: Asia (17%), Japan (17%), China (11%), East Pacific (5%). So, half the participants thought this speaker was from America, and half thought she was from an Asian country/region. This incongruent face-accent pairing yielded a smaller range of responses than the other incongruent face-accent pairing, the White face-Chinese-accented speaker, did.

Accent Strength

In the debriefing survey, participants were asked to rate the strength of the accent for each speaker on a scale from 1 to 7, where 1 represents very little foreign accent, and 7 represents very strong foreign accent. Figures 5 and 6 summarize the average ratings for accent strength.

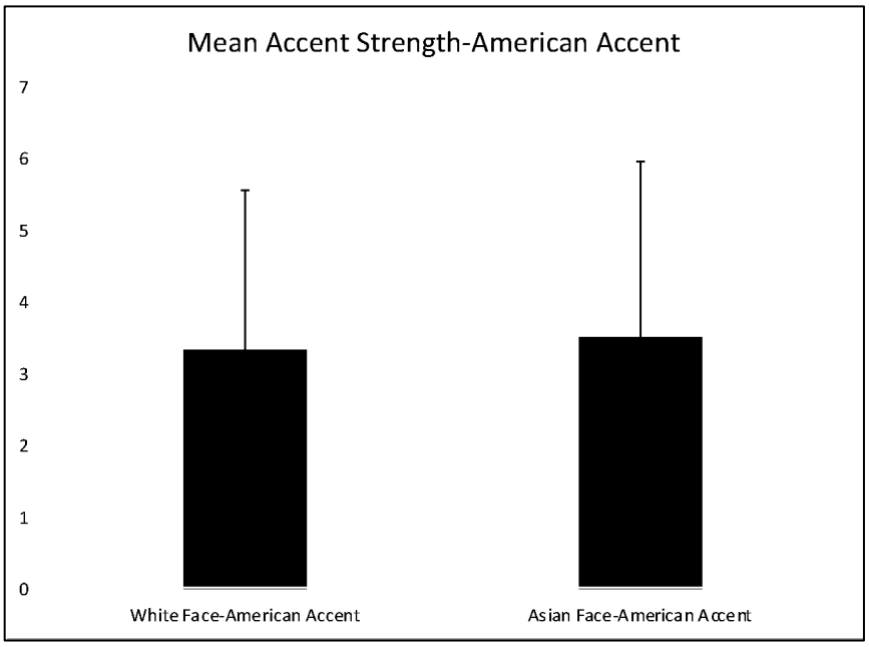

Figure 5. (Penn State participants') Mean Accent Strength for American Accent by Congruency (incongruent vs. congruent)

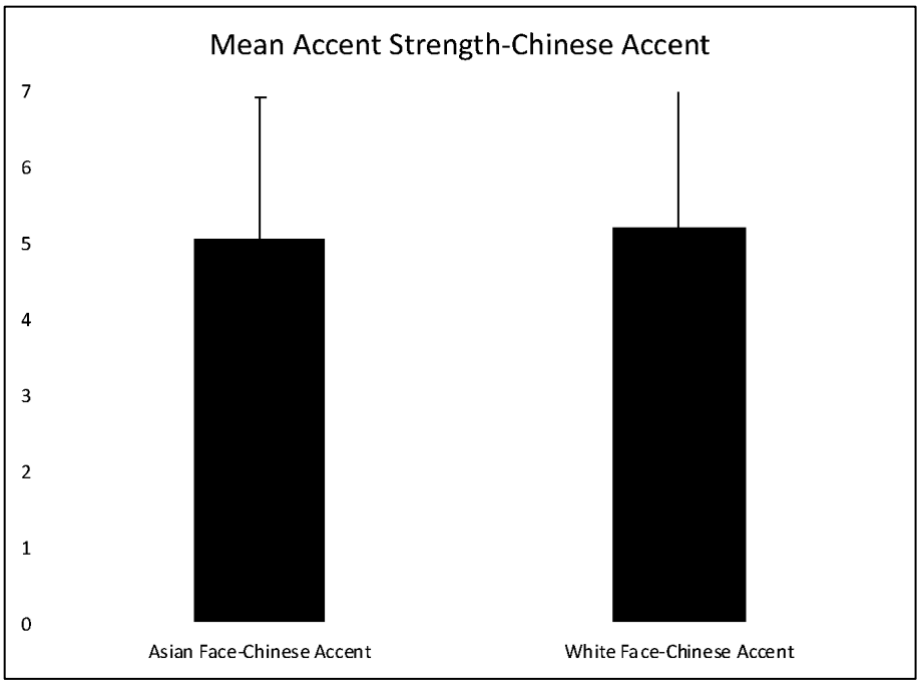

Figure 6. (Penn State participants') Mean Accent Strength for Chinese Accent by Congruency (incongruent vs. congruent)

For the Chinese-accented speech, no significant differences were found between congruent and incongruent conditions ($t(16)=0.40$, $p > .10$). For the American-accented speech, there were also no significant differences between the congruent and the incongruent conditions ($t(16)=.34$, $p>.10$). Moreover, there was a significant difference between accentedness ratings between both type of accents ($t(34)=2.94$, $p=.006$. Overall, as expected, Chinese-accented speech received higher accent strength ratings compared to American-accented speech.

Ease of Understanding

In the debriefing survey, participants also rated ease of understanding for each speaker on a scale from 1 to 7, where 1 represents very easy to understand, and 7 represents very hard to understand. Figures 7 and 8 summarize the average ratings for ease of understanding for each speaker.

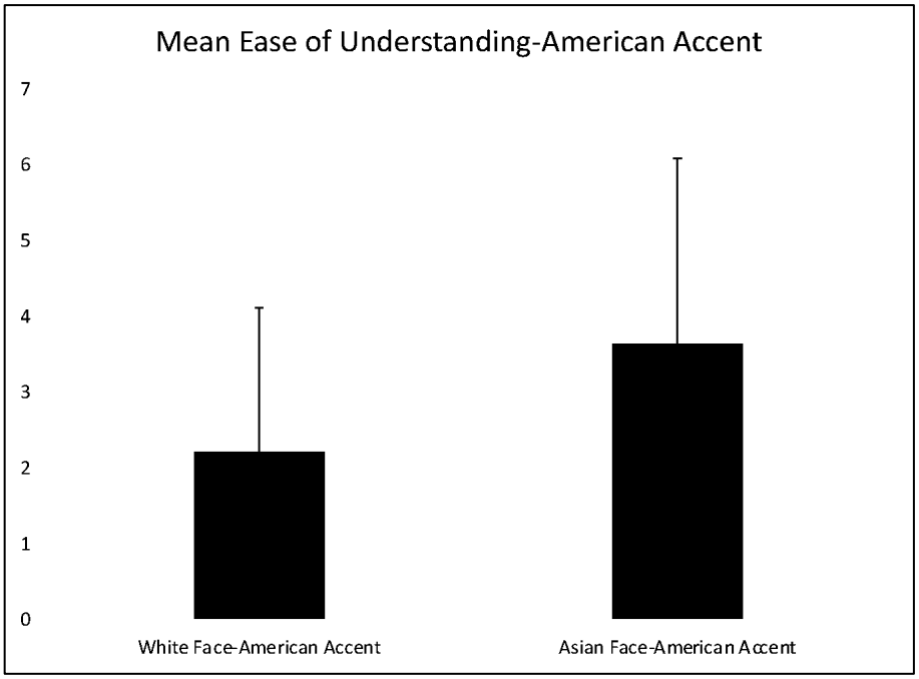

Figure 7. (Penn State participants') Mean Ease of Understanding for American Accent by Congruency (incongruent vs. congruent)

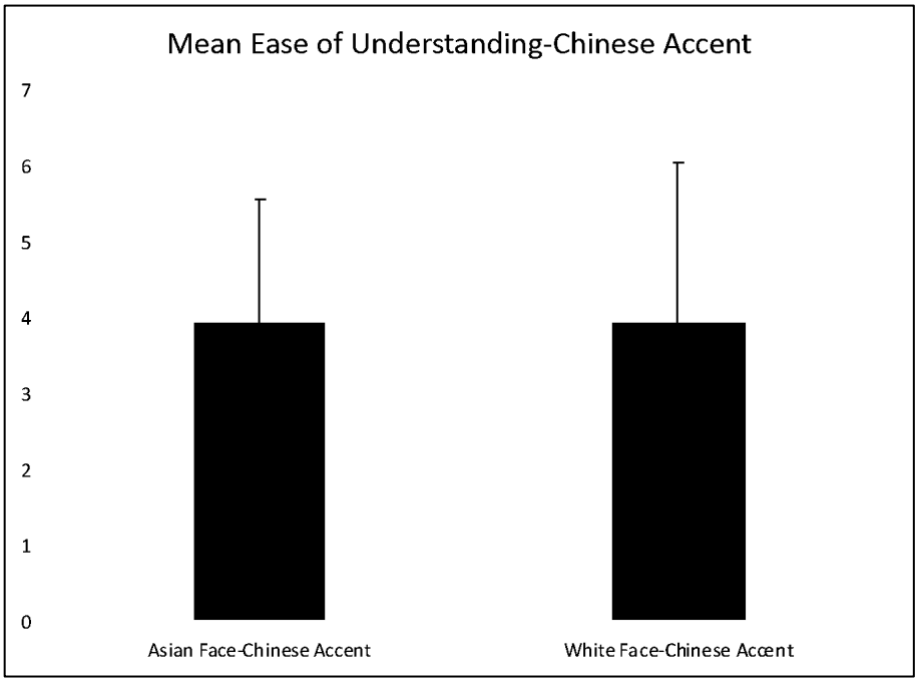

Figure 8. (Penn State Participants') Mean Ease of Understanding for Chinese Accent by Congruency (incongruent vs. congruent)

Analyses revealed that there was no significant difference between American and Chinese-accented speech in terms of ease of understanding (p>.10). Additionally, no significant differences were found between both accents in regards to congruency (both ps>.10), even though numerically participants had a harder time understanding the Asian Face-American Accent speaker (M = 3.65; SD = 2.45) than the American Face-American Accent speaker (M = 2.47; SD = 1.91), in line with the Reversed Linguistics Stereotyping hypothesis (but the difference did not reach significance).

Average Transcription Accuracy

The participants' written transcriptions were scored on accuracy for each target (semantically correct or incorrect word, grammatically correct and incorrect word), for all sentences in the four face-accent conditions (320 sentences per participant). Figure 9 displays the average transcription accuracy of the four face-accent conditions, collapsed across the semantically correct and incorrect target words and the grammatically correct and incorrect target words. Tables 4 presents the average transcript accuracy scores of the face-accent conditions for semantically correct and incorrect sentences. Tables 5 presents the average transcription accuracy scores of the face-accent conditions for grammatically correct and incorrect sentences.

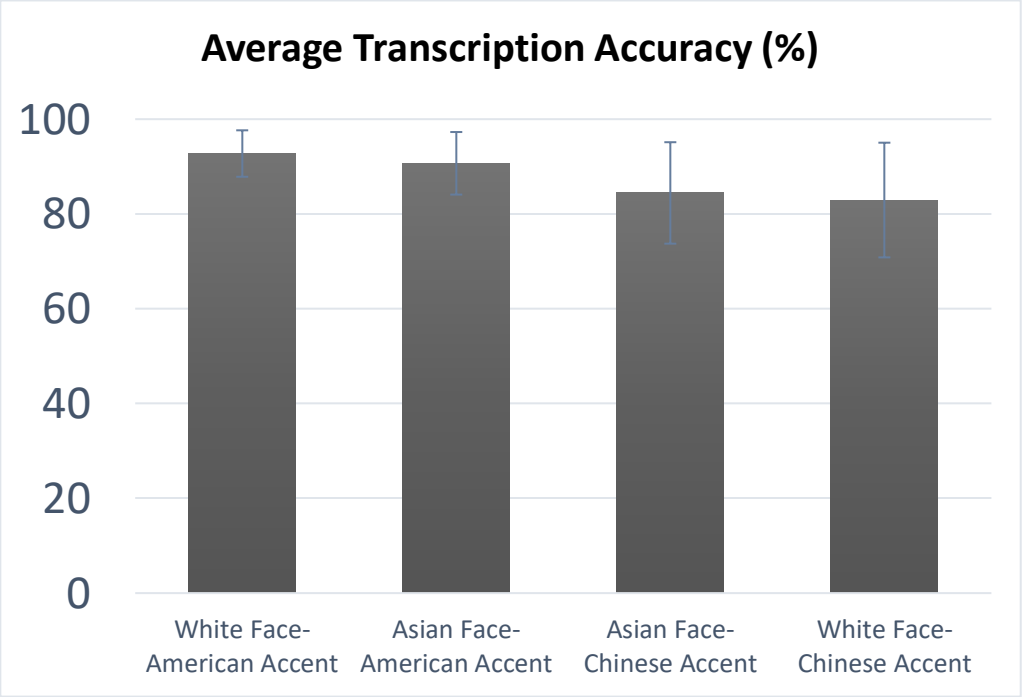

Figure 9. Average Transcription Accuracy (in percentages) for all Face-Accent Conditions, Collapsed across Semantically and Grammatically Correct and Incorrect Sentences.

Descriptive Statistics (Semantics) (%)					
Condition	N	Minimum	Maximum	Mean	Std. Deviation
Chinese Congruent SECO	17	20.00	95.00	76.59	22.96
Chinese Congruent SEIN	17	55.00	100.00	78.75	14.23
Chinese Incongruent SECO	17	30.00	100.00	74.21	20.33
Chinese Incongruent SEIN	17	30.00	95.00	74.10	18.46
American Congruent SECO	17	70.00	100.00	91.05	10.22
American Congruent SEIN	17	75.00	100.00	92.63	7.31
American Incongruent SECO	17	60.00	100.00	87.80	12.52
American Incongruent SEIN	17	53.00	100.00	89.21	13.39

Table 4. Descriptive Statistics for Transcription Accuracy of All Conditions for Sentences with Both Semantic Manipulations (correct/incorrect)

Descriptive Statistics (Pronoun/Grammatical) (%)					
Condition	N	Minimum	Maximum	Mean	Std. Deviation
Chinese Congruent ProCO	17	59.00	100.00	92.29	11.52
Chinese Congruent ProIN	17	72.00	100.00	93.14	8.90
Chinese Incongruent ProCO	17	70.00	100.00	90.96	11.71
Chinese Incongruent ProIN	17	61.00	100.00	88.95	10.61
American Congruent ProCO	17	87.00	100.00	96.81	4.14
American Congruent ProIN	17	80.00	100.00	94.90	6.00
American Incongruent ProCO	17	83.00	100.00	97.15	5.38
American Incongruent ProIN	17	78.00	100.00	94.44	6.21

Table 5. Descriptive Statistics for Transcription Accuracy of All Conditions for Sentences with Both Syntactic Manipulations (correct/incorrect)

The acronyms in the tables are identified as:

SECO=semantic correct; SEIN=semantic incorrect; ProCO= pronoun correct; ProIN= pronoun incorrect.

A series of 2 (type of accent: American accent, Chinese accent) by 2 (congruency: congruent, incongruent) by 2 (correctness target word: correct, incorrect) ANOVAs were run, separately for the American-accented sentences with semantically correct/incorrect target words, Chinese-accented sentences with semantically correct/incorrect target words, American-accented sentences with grammatically correct/incorrect target words, and Chinese-accented sentences with grammatically correct/incorrect target words, all of which in both the congruent and incongruent face-accent pairings.

Semantically correct and incorrect sentences.

The overall ANOVA revealed a significant main effect of accent, such that accuracy was higher for American-accented speech than for Chinese-accented speech ($F(1,16)=60.40$, $p<0.001$). The main effects of congruency and correctness target word were not significant, and none of the interactions were significant.

To specifically test the predictions of the Reversed Linguistics Stereotyping hypothesis, we also ran separate one-factor ANOVAs the American-accented speech condition and the Chinese-accented speech condition. Transcription accuracy for American-accented speech revealed a significant effect of congruency ($F(1,16)=5.11$, $p=0.038$). This indicates that the

congruent condition elicited higher accuracy than the incongruent condition. No congruency effect was found in Chinese-accented speech (p>.10).

Grammatically correct and incorrect sentences.

In regards to pronoun errors, a 2 (type of accent) by 2 (congruency) by 2 (correctness target word) ANOVA revealed a significant main effect of accent (F(1, 16)=9.36, p=0.007). Overall accuracy was lower for Chinese-accented English than for American-accented English, as expected. However, no effect of congruency was found, and thus there were no significant differences between the congruent and incongruent conditions for both the American-accented and the Chinese-accented sentences. The main effect of target words was not significant, and none of the interactions reached significance.

As with the semantically correct and incorrect items, the grammatically correct and incorrect items were analyzed for each Accent condition separately. No effects reached significant for the American-accent conditions, and no effects reach significant for the Chinese-accent conditions.

In sum, the transcription accuracy congruency effect was obtained in the American-Accented speech conditions (but only in the semantically correct and incorrect items): transcription accuracy was lower when American-accented speech was preceded by an Asian face than by a White face. No such effect was obtained for Chinese-accented speech. These findings support the RLS, and indicates that facial cues can activate certain expectations regarding a speaker's accent, but only in the case of native-accented speech. Incongruency between visual and acoustic signals leads to increased effort in integration, which affects overall

comprehension. This indicates that faces cuing ethnicity only trick our ears in native-accented, but not in foreign-accented speech.

Chapter 3 Experiment 2: Asian Chinese-English Bilinguals (tested in Beijing, China)

Methods

Half of the participants completed a transcription task identical to the one administered in Experiment 1. The other half of the participants completed an error detection task. Moreover, unlike the Penn State White monolingual students, the Chinese participants were China-born Chinese-English bilinguals studying at a Chinese university. These participants themselves are Chinese-accented speakers of English, and have Asian facial features. With that, they presumably have experienced a lesser amount of exposure to incongruent face-accent conditions in comparison to the English monolingual speakers within Experiment 1.

Participants

Forty-nine undergraduate students from Beijing Normal University (BNU) in Beijing, China were recruited and tested from May through July. Participants were recruited through WeChat, a messaging application that allows for users to post research study advertisements. It is commonly used for research participant recruitment in Beijing, and therefore was very effective in gathering individuals to participate. All were China-born Chinese-English bilinguals, native speakers of Mandarin-Chinese, and had learned English as a second language. None of the participants had previously lived in an English-speaking country for more than two months.

Of the forty-nine participants, twenty-five participants completed the offline transcription task, and twenty-four of them, on average 22.5 (*SD*=1.8) years old (17 females, 6

males, 1 other), completed the online error-detection task. Of the twenty-five transcription task participants, 12 were excluded from analyses due to failure to successfully complete the task. The 13 participants break down as follows: (average age: 22.8 (*SD*=2.19) years old, 9 females, 4 males). Data from five participants was excluded due to technical computer problems (most errors were during error detection task; a few during transcription task). We recruited additional students for testing to compensate for this. This caused the originally planned number of participants to increase from forty-four to forty-nine. Participants were paid for their participation.

Materials

The materials and procedure of the transcription task were similar to Experiment 1. A background questionnaire, a debriefing survey, as well as additional tests listed here were also administered to participants, to assess their English and Chinese language proficiency and working memory: MELICET, O-Span, and lastly, Chinese & English verbal fluency tasks. The MELICET is an advanced English language multiple-choice test administered to non-native speakers of English for admissions or placement purposes. It measures participants' English grammar and comprehension. The test consists of 50 fill-in-the-blank multiple-choice questions, 30 within standalone sentences, and 20 within a single passage that builds on itself. Participants were

The OSpan task uses simple math equations and sequential letter memory to evaluate working memory capacity (Turner & Engle, 1989). Participants were asked to memorize sets of 2-6 letters in the sequential order they were delivered, while simultaneously solving math

problems, recalling the correct order of letters after solving a number of math problems. One math problem was placed in between each letter presentation. Working memory was measured by the number of total letters retained, along with accuracy of solution to the math problems. The task is divided in 5 sections, each more complex than the previous, meaning participants must memorize an increasing number of words. Each trial begins with a fixation cross presented for 1000 ms. After the fixation cross, a math problem is presented, and the participant is given 3750 ms to respond. Follwing this, a letter is presented for 1250 ms in the center of the screen. At the end of each trial, participants are asked to choose the letters they recall. Participants are instructed to press 'd' to indicate the provided solution to the math problem was incorrect, and to press 'k' to indicate the solution was incorrect. All presented stimuli are in black font on a white background.

The verbal fluency task (Luo, Luk & Bialystok, 2010) is designed to test participants' ability to produce exemplars of a specific category. It was administered after the O-Span task. There are a total of five categories (body parts, colors, vegetables, instruments and vehicles) and for each category participants have 30 seconds to vocally provide as many responses as possible. Responses are recorded and later scored in order to obtain a total score of language production. Participants in this experiment carried out this task in first English, and then Chinese. In both cases, the tests themselves and the stimuli within them communicated in English; it was the language in which participants used to respond that changed from English (English verbal fluency task) to Chinese (Chinese verbal fluency task).

Procedure

The transcription task carried out at BNU followed the same procedure as the transcription task carried out with the Penn State students. The testing took place in a room identical to the testing of Experiment 1. The entire test lasted around 2.5 hours. After providing written consent, participants filled out the previously mentioned language background and history questionnaire, and thereafter began the transcription task. Transcription participants completed an extensive language history and background questionnaire, along with the debriefing questionnaire (accent identification survey).

In the error detection task, participants completed the additional behavioral tasks (Chinese and English verbal fluency, OSpan, and MELICET tasks). However, the transcription participants did not complete these tasks.

In the error detection task, participants listened to a sentence and were instructed to press a button immediately as they heard a semantic or a syntactic (grammatical) error. Three seconds after their button press, or after the offset of the sentence if participants did not detect an error and did not press a button, presentation of the next sentence would begin. To be specific, the buttons of which they were assigned to press were as follows: participants were instructed to press the spacebar after hearing a semantic or syntactic error; when answering comprehension questions, half of participants were instructed to press the “D” key on the keyboard for “Yes” and the “K” key on the keyboard for “No”, or vice versa for the other half.

Participants in the error detection task were instructed to listen to a sentence and press a button if/when they perceived a semantic or syntactic error. They were additionally instructed to use the previously specified keys to answer Yes/No comprehension questions about the sentences that preceded them. Here, the dependent measure is reaction time, or the difference in

RT of error detection between Chinese-accented English sentences and American-accented English sentences.

After error detection was complete, they were provided the OSpan task, subsequently the MELICET, then finally an English verbal fluency (VF) task, followed by a Chinese verbal fluency (VF) task.

Results

Speaker Country Identification

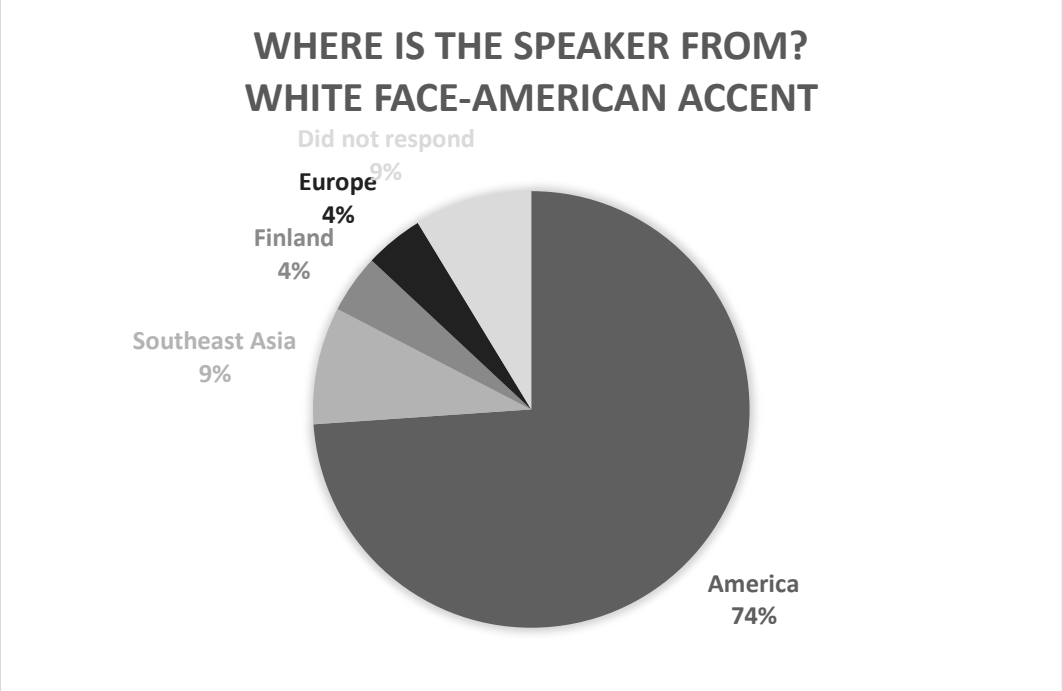

Figure 10. Beijing participants' Country Assignments for White Face-American Accent Condition (in percentages)

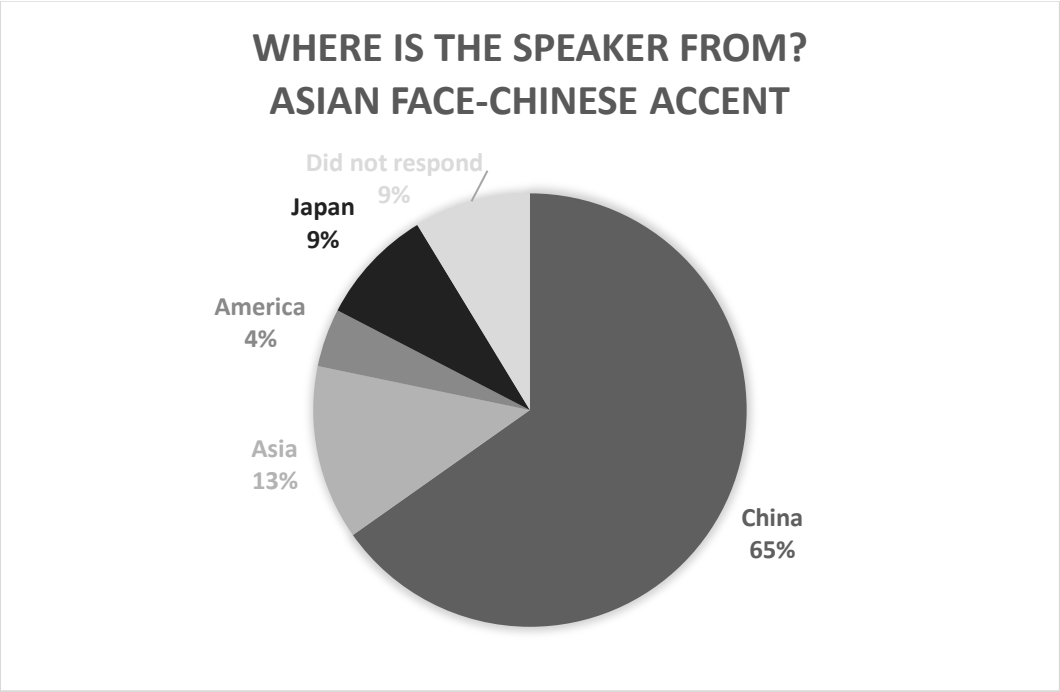

Figure 11. Beijing participants' Country Assignments for Asian Face-Chinese Accent Condition (in percentages)

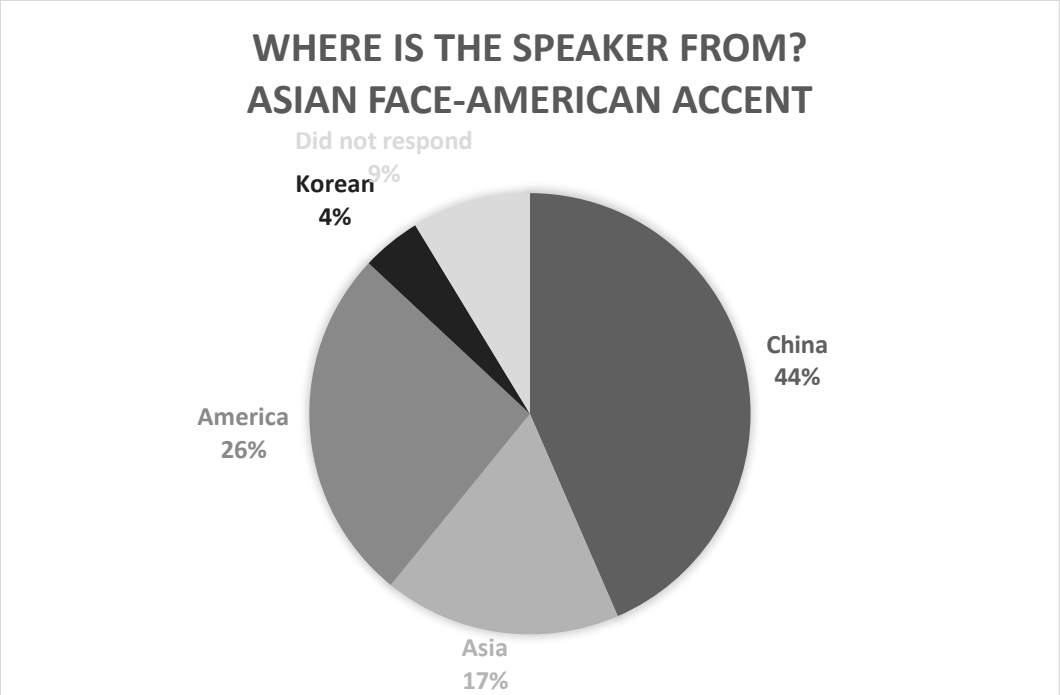

Figure 12. Beijing participants' Country Assignments for Asian Face-American Accent Condition (in percentages)

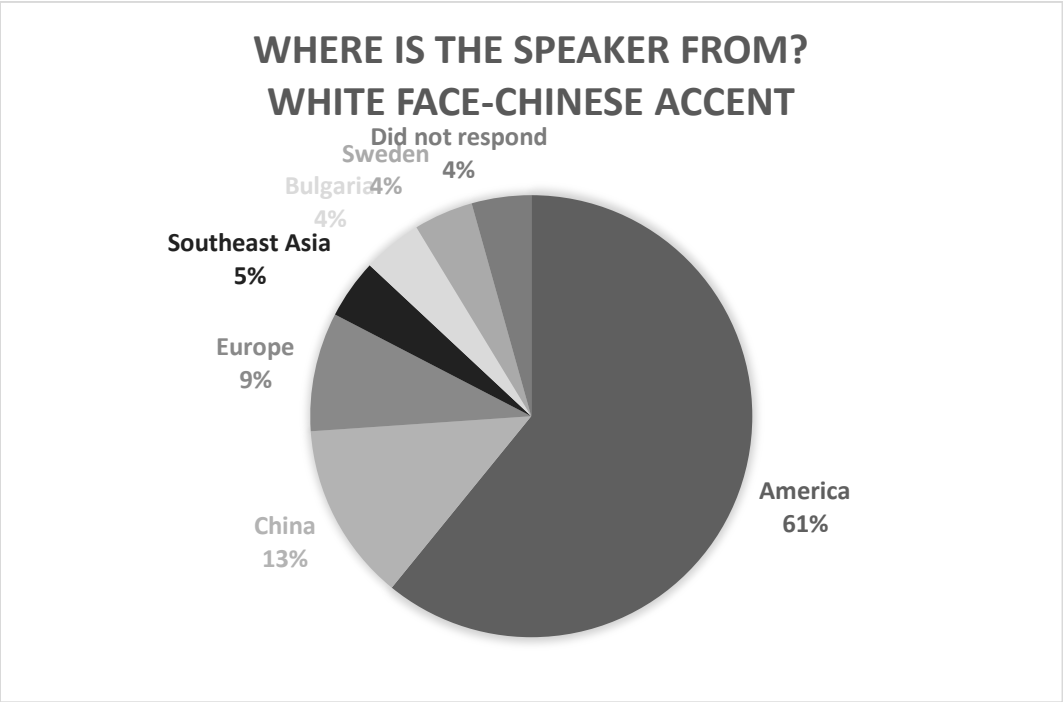

Figure 13. Beijing participants' Country Assignments for White Face-Chinese Accent condition (in percentages)

In the case of the Asian Face-Chinese Accent, Asian Face-American Accent, and White Face-American Accent, 9% of participants did not respond to this section of the questionnaire. For the White Face-Chinese Accent, 4% of participants did not respond.

Between the four speaker conditions, the White Face-American Accent but also the White Face-Chinese Accent conditions were reported more frequently as being from America (74% and 61%, respectively) than from any other country or region, suggesting that the participants based their responses more on facial cues than on acoustic cues.

For the Asian Face-Chinese Accent and the Asian Face-American Accent conditions, the majority of participants thought the speaker originated from an Asian region (87% and 65%,

respectively). Also, for these conditions, the participants relied more on facial features than on acoustic features to assess the speakers' country of origin. Possibly, because the Chinese-English bilingual participants were listening to the sentences in their L2 English (and experienced major difficulties in understanding L2 English, as revealed by their transcription data discussed below), they may have been inclined to rely less on acoustic information and more on facial information.

Accent Strength

Following the procedure used for the Penn State participants (Experiment 1), accent strength was calculated from debriefing questionnaires for Beijing participants. Their data were analyzed using the same analyses as in Experiment 1. None of the effects reached significance.

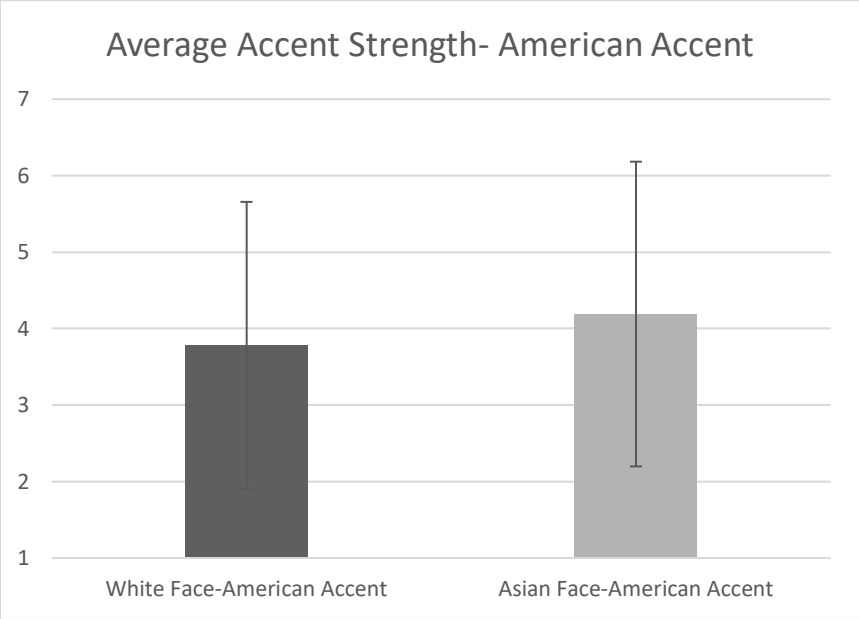

Figure 14. (Beijing participants') Average Accent Strength Comparison by Congruency for American Accent Conditions

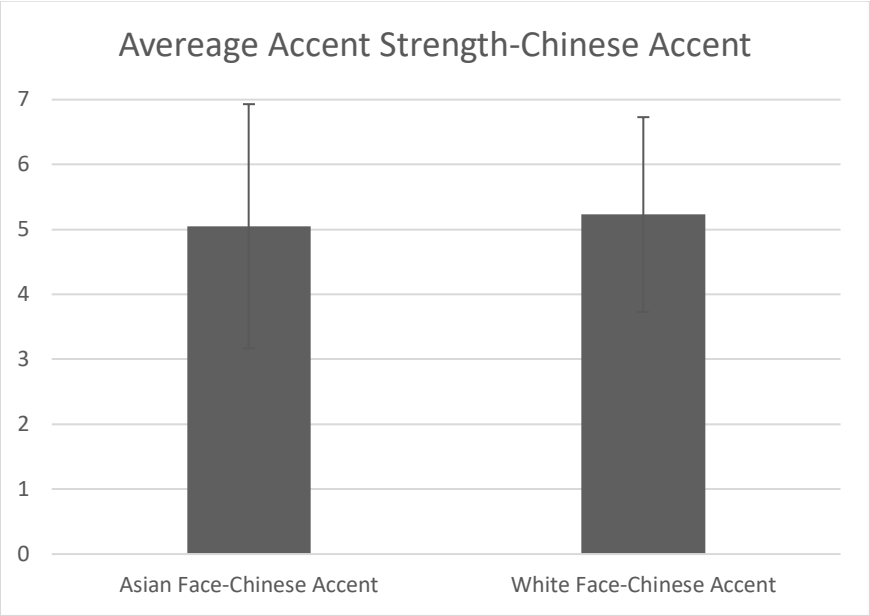

Figure 15. (Beijing participants') Average Accent Strength Comparison by Congruency for Chinese Accent Conditions

Within the debriefing questionnaire, participants were additionally asked to rate their ease with which each speaker's speech was understood. This was also quantified on a seven-point scale, as mentioned previously. Results are compared by congruency, (incongruent conditions versus congruent conditions) for each accented speech condition (American-accented and Chinese-accented). A t-test revealed there were no significant differences in terms of accentedness ratings between American and Chinese-accented speech (p=.09). Furthermore, congruency did not have a significant effect on this score (p>0.1).

Ease of Understanding

Using the same procedures and analyses as in Experiment 1, the Beijing participants' ease of understanding ratings were analyzed. None of the effects reached significance.

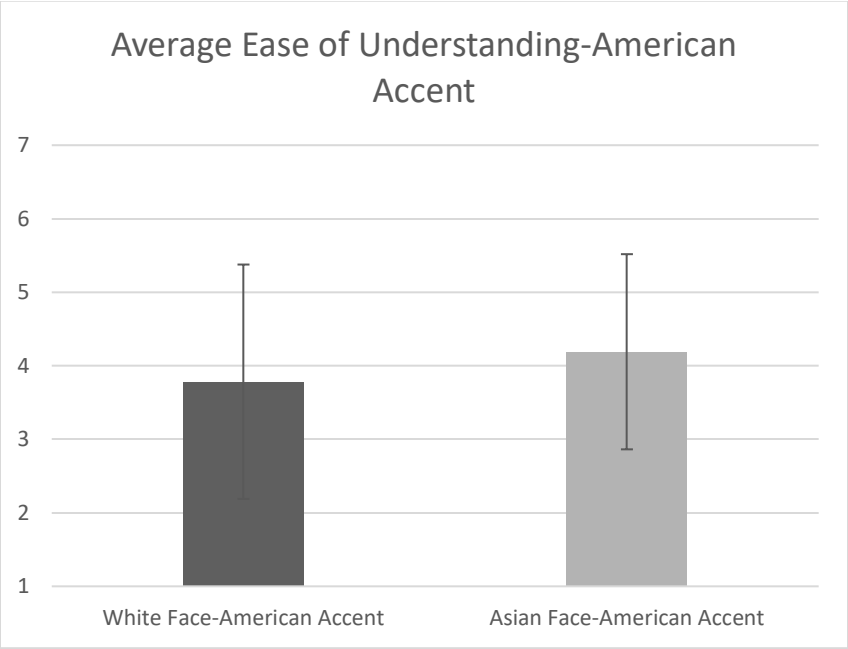

Figure 16. (Beijing participants') Average Ease of Understanding Comparison by Congruency for American Accent Conditions

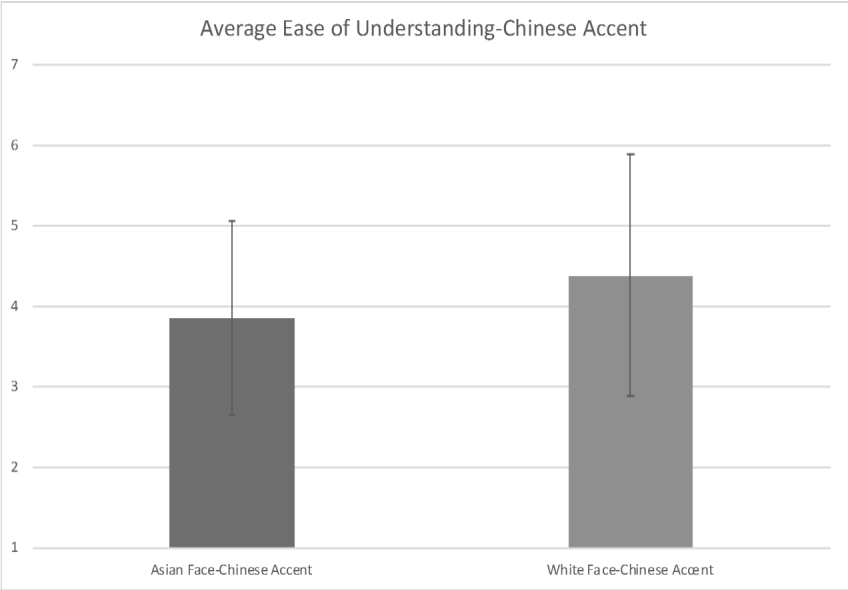

Figure 17. (Beijing participants') Average Ease of Understanding Comparison by Congruency for Chinese Accent Conditions

Similar results to that of accent rating were found for ease of understanding. Overall, no significant differences in terms of ease of understanding between American and Chinese accented speech were found (p>0.1). There also was no significant effect on this score in terms of congruency (p>0.1).

Error detection

The data from the error detection task cannot be reported, as participants overwhelmingly did not understand the procedure, and completed the task incorrectly.

Transcription accuracy

Transcription Accuracy	
Participant Number	Accuracy of Transcription (%)
301	31.56
302	16.25
303	16.87
304	44.06
305	18.75
306	0.62
307	9.88
316	38.42
317	7.50
318	28.87
319	2.19
320	15.94

321	16.25
Average Accuracy	19.01 (*SD*=13.31)

Table 6. Transcription Accuracy (percentages) for Each Transcription Task for Beijing Participants

As can be seen in Table 6, the overall transcription accuracy was very low (M = 19.01% (*SD*= 13.31). Therefore, the results could not be broken down by sentence type or by congruency, and thus the differences between different conditions cannot be analyzed and discussed. It should be noted that transcription accuracy was highly varied; the participant with the highest accuracy score correctly transcribed 44.06% of sentences, and the participant with the lowest accuracy transcribed less than 1% (0.62%) of the sentences correctly.

Chapter 4 General Discussion & Conclusion

This study was conducted with the goal of answering two main questions: 1) how do visual cues in regard to a speaker's ethnicity (e.g. Asian face versus White face) create language expectations in listeners (e.g. listeners expect to hear Chinese-accented English after viewing an Asian face)?; and 2) how do these biases impact the comprehension of American- and Chinese-accented English?

I will discuss the main findings of both experiments, first discussing the main results of experiment 1 then following with a discussion of the results from experiment 2. Then, I will address these findings in relation to both findings from previous research and to the Reverse

Linguistic Stereotyping hypothesis. I will comment on the limitations of the study, and finally discuss future directions for this field of research.

In regards to experiment 1, we found that participants reported the Asian Face-American Accent speaker to be from a smaller range of regions/countries than the other incongruent face-accent pairing, the White Face-Chinese Accent.

For the Chinese-accented speech, there were no significant differences in accent ratings between the incongruent and congruent conditions. The same was found for the American accent conditions, and thus when American-accented speech was presented, there was not a stronger perception of foreign accent when the speaker was presented as Asian rather than White. Furthermore, as expected, Chinese-accented speech received higher accent strength ratings than American-accented speech. Overall, participants perceived speech indeed produced with a Chinese accent as being more accented. Thus, regardless of the visual cue, the Chinese-accented speech was perceived as more accented, and the physical appearance (i.e. facial cue) that accompanied did not influence or strengthen this factor in either direction.

Results on ease of understanding also revealed no significant differences between Chinese Accented and American-accented speech. Numerically, participants had a harder time understanding the Asian Face-American Accent speaker compared to the American Face-American Accent speaker, which supports RLS (Reverse Linguistic Stereotype hypothesis), but this difference did not reach significance. There may have been marginal significance, meaning that physical appearance did influence ability to perceive speech, but the analysis conducted did not find significance.

The main experimental task revealed a significant main effect of accent, signifying that transcription accuracy was higher for American-accented speech than for Chinese-accented

speech, which was expected. To test our predictions related to RLS, we ran separate ANOVAs, which found a significant effect of congruency for American-accented speech, where within the Semantic condition, the congruent condition elicited higher accuracy compared to the incongruent condition. Within the Chinese-accented speech conditions, no effect of congruency was found, meaning there was not a significant difference in transcription accuracy scores between the congruent and incongruent face-accent pairings. Thus, difficulty in the processing of foreign-accented speech is not alleviated by congruent facial cues. This indicates that monolinguals' lack of experience with this type of accent, leads to a decrease in comprehension (irrespective of the congruency of the facial cue presented with it). Specifically, there was no effect of physical appearance (congruency) in the Chinese-accented Semantic condition, as well as both the American and Chinese-accented Grammatical conditions. This concludes that faces cuing ethnicity can trick English monolinguals' ears in American Accented, but not Chinese Accented speech. This supports the Reverse Linguistic Stereotyping hypothesis because it directly demonstrates that facial cues can activate certain expectations regarding a speaker's accent; what a listener is exposed to visually impacts their perception of the speech that follows, such that the same, American-accented speech is more difficult to transcribe, and requires more effort to integrate visual and acoustic signals, when following the image of a Chinese face compared to when it is following the image of a White face. There may be an expectation that upon seeing a Chinese face, the speech following will be foreign-accented.

In discussing the main findings of experiment 2, it is important to mention that of the original forty-nine participants, only data from thirteen could be analyzed. The results of the error detection task cannot because again, participants overwhelmingly did not understand the task, and incorrectly completed the task. Moving onto the results that can be discussed, the

speaker country identification portion of the debriefing questionnaire concluded that the majority of participants reported that each speaker was from China or America. Those were the two most reported choices. The results suggest that participants based country identification on facial cues rather than acoustic cues, because the majority of participants reported that both speakers paired with the image of a White face were from America. Regardless of the different accents, they were more likely to report that the speakers paired with a White face were American. In both Asian Face conditions (Asian Face-Chinese Accent and Asian Face-American Accent), participants most often reported that the speaker originated from an Asian region. This again supports that the Beijing participants relied more on facial cues than on accent in the speech, and supports RLS by demonstrating that to some extent, visual cues impacted speech comprehension in terms of what country they believed the speakers were from.

Results on accent strength revealed no significant differences in terms of accentedness ratings between American and Chinese-accented speech. No significant differences were found between congruencies as well, which contradicts RLS because it does not provide any evidence that visual cues impacted their speech comprehension, or specifically, the strength of the accents perceived.

To add, analysis of the ease of understanding revealed similar results, as no significant differences between American and Chinese-accented speech were found, nor was there a significant effect in terms of congruency. This also contradicts RLS, as it means that the participants did not find the American-accented and Chinese-accented speech to be harder when the facial cue presented with it was incongruent compared to when it was congruent.

In approaching the final error detection task, these results as well cannot be discussed in detail, as overall transcription accuracy was very low, such that the results could not be divided

into sentence types or congruencies and comparisons between these conditions could not be made. This marked low average will be discussed in study limitations.

In summation, these results support the RLS effect in English monolinguals (Penn State students) for transcription accuracy in American-accented speech, but not in Chinese-accented speech. With that, these results support what was expected based on the findings of Cristia et al., (2012), in that comprehension of foreign-accented, or in this case Chinese-accented speech tends to be more effortful than comprehension of native-accented, in this case American-accented speech.

A comparison similar to the one made in the Baese-Berk, Bradlow, and Wright (2013) study cannot be made, as only results from English monolinguals could be tested, whereas their findings concluded that listeners exposed to multiple types of foreign-accented speech are faster and better in foreign-accented speech comprehension than those exposed to only one type of foreign-accented speech by using one task to expand upon a previously explored task, and simply adding more foreign accents. Thus, we could not conclude whether or not language experience, and specifically experience with foreign-accented speech, modulates the effects of congruency and incongruency between visual and audio cues in speech comprehension.

These findings are in line with that of Rubin (1992), which concluded that participants perceived foreign accent where speech was actually native but visual cues presented were that of an Asian face, rather than a White face. They also support the presence of Reverse Linguistic Stereotyping, as introduced in the findings of Kang and Rubin (2009). Both Penn State and Beijing Normal University participants alike seemed to rely on or be impacted by visual appearance in determining the speakers' country of origin (experiment 2) or in transcribing speech (experiment 1).

However, the findings do not directly support the results from McGowan (2015), which found that visuals cues aid in the ability to successfully comprehend speech, because congruency had no significant effect on transcription accuracy of Chinese-Accented speech, meaning that the congruent (Asian Face-Chinese Accent) condition did not elicit significantly higher average transcription accuracy than the incongruent (Asian Face-American Accent) condition. This may speak to the idea that English monolinguals are more likely to engage in RLS when presented American-Accented speech than when presented Chinese-Accented speech. It is possible RLS was only found in American-Accented speech, and not in Chinese-Accented speech because this sample of English monolinguals are very familiar with American-Accented English, and are largely unfamiliar with foreign-accented English. Thus, foreign-accented English may be altogether harder and more effortful in perception, but the physical appearance (i.e. the face) of the speaker does not influence this speech perception.

Future Directions

Further experiments will most likely implement both error detection and transcription experimental tasks in in the presence of visual cues representing the speakers' physical appearance. However, these experiments should account for the varying English proficiencies of participants whom speak English as a second language through the administering of an English proficiency assessment prior to admittance into participation. Another solution would accommodate for varying proficiency by shortening the sentence stimuli length. This would remove the possibility of participant data becoming unusable due to incompletion because of the

difficulty of the task, and would answer the research question as to whether or not facial cues affect online detection of errors.

For all experiments, more data collection and analysis of data should be conducted to increase power. Future studies should aim to test monolinguals with vast experience with Chinese-accented speech. This will increase our understanding and accuracy in representing individuals with varying levels of experience with Chinese-accented speech, and would answer the research question posed earlier as related to how language experience modulates the effects of congruency and incongruency between visual and linguistic cues in the comprehension of speech. Furthermore, collecting data on both semantic and grammatical (pronoun) errors would allow for a compared analysis by type of error (pronoun vs semantic).

Limitations

There are a few limitations to this study that will be discussed in order, first remarking on the first experiment, and then discussing the second experiment.

The first experiment, testing undergraduate students from an introductory psychology class at Penn State, encountered difficulties in that out of the original twenty-one participants, only seventeen of them (n=17) were able to successfully complete the task. The experiment took participants around 2 hours and 45 minutes, which was too long for some participants the remain attentive.

The second experiment, which took place at Beijing Normal University in Beijing, China, was met with multiple obstacles along the way. First, participants had a hard time detecting the errors in the sentences, and seemed to not understand the task. Possibly, because pronoun errors

as used in this task are highly common in Chinese-accented English, they may not have noticed any errors in quite a number of sentences, which may have led to confusion. Another possibility is that their L2 English proficiency is not high enough to perform this task. Indeed, the average transcription accuracy was 19.01%, and these data could not be analyzed because too few participants were able to complete the task. In future studies, L2 speakers with a higher level of L2 proficiency should be recruited, or simpler sentences should be used.

REFERENCES

Babel, M., & Russell, J. (2015). Expectations and speech intelligibility. *The Journal of the Acoustical Society of America*, *137*(5), 2823-2833.

Bradlow, A. R., & Bent, T. (2008). Perceptual adaptation to non-native speech. *Cognition*, *106*(2), 707-729.

Baese-Berk, M. M., Bradlow, A. R., & Wright, B. A. (2013). Accent-independent adaptation to foreign accented speech. *The Journal of the Acoustical Society of America*, *133*(3), 174-180.

Clarke, C. M., & Garrett, M. F. (2004). Rapid adaptation to foreign-accented English. *The Journal of the Acoustical Society of America*, *116*(6), 3647-3658.

Cristia, A., Seidl, A., Vaughn, C., Schmale, R., Bradlow, A., & Floccia, C. (2012). Linguistic processing of accented speech across the lifespan. *Frontiers in Psychology, 3*, 479.

Fernandez B. C., & Van Hell, J. G. (2019). *The Role of Speaker Identity on the Processing of Native and Foreign-Accented Speech.* (Unpublished doctoral dissertation). The Pennsylvania State University, State College, PA, United States.

Grey, S., & van Hell, J. G. (2017). Foreign-accented speaker identity affects neural correlates of language comprehension. *Journal of Neurolinguistics*, *42*, 93-108.

Kang, O., & Rubin, D. L. (2009). Reverse linguistic stereotyping: Measuring the effect of listener expectations on speech evaluation. *Journal of Language and Social Psychology*, *28*(4), 441–456.

McGowan, K. B. (2015). Social expectation improves speech perception in noise. *Language and speech*, *58*(4), 502-521.

Nelson, G. & Greenbaum, S. (2016). *An Introduction to English Grammar.* New York, NY: Routledge.

Rubin, D. L. (1992). Nonlanguage factors affecting undergraduates' judgments of nonnative English-speaking teaching assistants. *Research in Higher education*, *33*(4), 511-531.

Simons, G.F & Fennig, C.D (2017). Ethnologue: Languages of the World. 20th Ed. Dallas, Texas: SIL International.

Turner, M. L., & Engle, R. W. (1989). Is working memory capacity task dependent?. *Journal of Memory and Language*, *28*(2), 127-154.

Academic Vita of Carly Danielson

carlydanielson11@gmail.com

Education

The Pennsylvania State University, University Park, PA
Bachelor of Science in Psychology, College of the Liberal Arts, Life-Sciences Option
Secondary Major in Linguistics
Minor in Chinese, College of the Liberal Arts
Honors in Psychology (Thesis Advisor: Dr. Janet G. Van Hell):
The Influence of Physical Appearance on Listeners' Accented Speech Comprehension

Research Experience

CAT (Cognition Affect Temperament) Laboratory April 2017-Present

- Research Assistant (Behavioral coder using Datavyu program)

BiLD (Bilingualism and Language Development) Laboratory Spring 2018-Present

- Research Assistant (Transcription Coding using PRAAT & running ERP experiments)
- YSSS Poster Exhibition Presentation Spring 2019
- PIRE NSF Grant (research in Beijing, China) Summer 2019
    - Research on the influence of speakers' physical appearance on listeners' accented speech comprehension

Teaching Experience

Instructor: Spring 2019
The Pennsylvania State University- Psychology 296 : *The C.R.E.A.T.E. Approach to Developmental Psychology*
Faculty Advisor: Cathleen Hunt, Ph.D.

- Facilitated class discussions and created/modified course curriculum (*syllabus and specific course content available upon request)*
- Instructed a group of 5 students who were simultaneously enrolled in Psychology 212: Introduction to Developmental Psychology

Head Undergraduate Teaching Assistant Fall 2016-Present
The Pennsylvania State University- Psychology 212: Introduction to Developmental Psychology
Faculty Advisor: Cathleen Hunt, Ph.D.

- Communicate weekly with the course instructor to discuss facets of the head teaching assistant position − Facilitate distribution of review materials for student use
- Meet with students upon request to assist with class-related questions/concerns
- Participate in curriculum development with the instructor

Activities/Leadership

Crisis Shelter of Lawrence County Intern Summer 2018

- Led daily house meetings, created camps for public outreach, completed 64.25 hours of training and 150 total hours
- PSUkulele/Performance Team (President) 2016-Present
- Penn State Photography Club (Marketing Chair) 2016-Present
- Earth & Mineral Sciences THON and Student Council Member Fall 2015-Present
- Penn State Figure Skating Team Member Fall 2019

Honors and Awards

- The Pennsylvania State University Dean's List Fall 2015-Present
- Gateway Acceptance into Schreyer Honors College Summer 2018-Present
- Psi Chi National Honor Society (Penn State Chapter) Spring 2018-Present
- Paterno Fellows Program Summer 2018-Present
    - Honors Program including advanced coursework, thesis, study abroad and/or internship, ethics study, and leadership/service commitment
- NSF PIRE Grant Recipient Summer 2019
    - (Partnerships for International Research and Education)
- Erickson Discovery Grant Spring 2019
- Psychonomic Society Annual Meeting Fall 2019 Presenter Fall 2019
- Quell Foundation Bridge the Gap Scholarship Summer 2018 & 2019
- Poole Family Honors Scholarship Spring 2019
- Schreyer International Scholarship Fall 2018-Spring 2019
- National Honor Society of Leadership and Success Fall 2016-Present
- M Sanderson Study Abroad Liberal Arts Scholarship Fall 2018
- The Penn State College of the Liberal Arts Enrichment Funds 2017-2019
- National Honor Society Member 2012-2015
- Citizenship Award & American Legion Award 2009-2015

Presentations and Posters

- **Danielson, C. A.**, Fernandez, C.B., Guo, T., & van Hell, J.G. 2019, February). *The Influence of Speakers' Physical Appearance on Listeners'. Accented Speech Comprehension*. Presentation given at Spring 2019 Young Scholar Speaker Series (YSSS) Poster Session using previous research on the subject of foreign-accented speech comprehension as well as conceptual information.
- **Danielson, C. A**., Klemencic, M. E., Hunt, C.B., Cleveland, H. H. (2019). *C.R.E.A.T.E. Meaningful Learning: A Strategic Investigation of the Pedagogical Efficacy of Concept Mapping in Undergraduate Psychology Education.* Poster presentation at the 2019 Psi Chi Undergraduate Research Conference, in University Park, PA.
- **Danielson, C. A**., Klemencic, M. E., Hunt, C.B., Cleveland, H. H. (2019). *C.R.E.A.T.E. Meaningful Learning: A Strategic Investigation of the Pedagogical Efficacy of Concept Mapping in Undergraduate Psychology Education.* Poster

presentation at the 2019 Undergraduate Research Exhibition, in University Park, PA.

Internship Experience

Crisis Shelter of Lawrence County Intern **Summer 2018**
New Castle, PA

- Completed 65 hours of training on topics such as domestic violence and confidentiality including Mandated Reporting
- Assisted therapists in providing services to clients
- 150 total hours

Global Awareness

CIEE: China in A Global Context Shanghai, China

- Spent 1 semester (Fall 2018) abroad
- Completed 15 credits in Mandarin Chinese and related courses
- Taught English to local students through internship program

PSYCH 299: Exploring Early Childhood Education in Cambodia Siem Reap, Cambodia

- Spring 2017, 2018, & 2019
- Funding/Support: Penn State Global Programs, Penn State College of the Liberal Arts
- Traveled to Siem Reap, Cambodia during Spring Break 2017, 2018, and 2019 (approximately seven days each) with a small group of students and faculty members.
- Explored cultural, historical, and educational aspects of Cambodia before, during, and after this trip.
- This course acted as an embedded component of PSYCH 212 (Introduction to Developmental Psychology), for which I was a teaching assistant.

Work Experience

Links to Everyday Lives Staff Person **Summer 2019-Present**
Disability Options Network (*DON) Services* New Castle, PA

- Worked as a personal care attendant for persons with intellectual and/or physical disabilities
- Provided all needed services and assistance in home health and within community

Summer Camp Program Counselor **Summer 2017-Summer 2018**
Lawrence County Association for Responsible Care New Castle, PA

- Supervised and provided necessary care to 1-5 individuals with intellectual disabilities aged five to 26 each week
- Led understanding and growth of responsibility and character in campers

Dental Office Assistant **Summer/Winter 2015-2017**
Dr. Marc S Rashid Dental Practice New Castle, PA

- Prepared, cleaned, and sterilized examination rooms and medical tools

- Assisted hygienists/doctors in procedures and providing proper equipment
- Organized and filed patient information

Ice Cream Server **Spring 2013- Fall 2017**

Forbush Drive-In New Castle, PA

- Created and served various deserts and food items
- Handled customers and returned change without use of calculator/cash register