The Influence of Accent on Perceptions of Credibility

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Nathan Taylor
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ABSTRACT

This thesis explores the influence that the New Zealand, Chinese, and Scottish accents have on perceptions of credibility in the New Zealand context. Listener respondents judged the truthfulness of a series of trivia statements, such as “Slugs have four noses”, spoken by six different speakers. The aim was to discover whether speakers of a particular accent are judged as less credible than native speakers. A number of previous studies have employed a similar methodology and reported contradictory results. This thesis contributes to the ongoing discussion on the role that accent plays regarding perceptions of credibility. Results indicate that certain accents are perceived as less credible than others. A mildly accented New Zealand speaker was rated as the most credible, while a mildly accented Scottish speaker was rated as the least credible. Also, this study found that male listeners as well as non-native listeners were more likely to rate speakers as more credible. The results are discussed in light of the previous literature and it is suggested that associated stereotypes and listeners’ familiarity of an accent had an effect on perceptions of credibility.

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Chapter 1

Introduction

Throughout our daily lives, aspects of the way we speak constantly affect how we are perceived by others. One important aspect is one's accent. We often consciously think about *what* we say, but rarely realise that *how* we say it also affects other people's perceptions of us. Sometimes an accent can have positive effects on how we are perceived in society, while at other times, it can cause a person to be stigmatised, ostracised or even unfairly judged. The way we speak affects people's perceptions of many different characteristics, including prestige, intelligence, trustworthiness, friendliness, credibility and even attractiveness (Fuertes, Potere, & Ramirez, 2002; Lindemann, 2003; Anderson, Downs, Faucette, Griffin, King, Woolstenhulme, 2007; Lev-Ari & Keysar, 2010). All of these play significant roles in our lives, and influence decisions in many areas, from whether or not we trust a salesperson (DeShields, Kara & Kaynak, 1996), to how we are perceived in a job interview (Segrest Purkiss, Perrewé, Gillespie, Mayes, Ferris, 2006), and even to how we are judged by juries in courts (Dixon, Mahoney, & Cocks, 2002). It is important to study these phenomena and their effects and to be aware that the way a person speaks can have discriminatory effects in many situations.

The discipline of sociolinguistics has shown that non-native accents are often perceived as inferior to native accents in many aspects, including intelligence (Bradac, 1990; Lindemann, 2003; Rubin, Healy, Gardiner, Zath, & Moore, 1997), loyalty (Edwards, 1982), and competence (Boyd, 2003; Bresnahan, Ohashi, Nebashi, Liu, & Shearman, 2002). Native non-standard accents are also often perceived negatively, sometimes even by speakers of non-standard accents themselves (Cargile & Giles, 1998). Research has shown that, although non-native and non-standard English accents perform less well in areas related to *status,* they do often perform better when it comes to ratings in *solidarity* (Edwards, 1982). Status generally refers to perceived characteristics such as intelligence, education, social class, and success of the speaker, while solidarity on the other hand usually refers to the perceived friendliness, trustworthiness, and kindness of the speaker (Giles, 1970).

The implications of these negative perceptions have repercussions in a variety of circumstances and situations. Many studies have shown that foreign-accented speakers are given lower employability ratings (Segrest Purkiss, et al., 2006; Carlson & McHenry 2006;

Hosoda & Stone-Romero 2010), are less likely to receive venture funding (Huang, 2014) and are given more negative evaluations regarding the way in which they speak (Lindemann, 2003).

Kalin and Rayko (1978) researched the effect that an accent has on job applications. In their study, Canadian English-speaking participants evaluated a total of 10 job applicants across four jobs which varied in social status. Five of the applicants had a Canadian accent, and five had a foreign accent. The results showed that the foreign-accented applicants were evaluated as less suitable for the higher status jobs, but more suitable for the lower status jobs when compared with the applicants who spoke with a Canadian accent (Kalin & Rayko, 1978).

An important characteristic conveyed through a person's accent is credibility. The relationship between credibility and accent has stimulated research in many contexts, such as marketing, teaching, and the law. With regard to marketing, a study by DeShields, Kara and Kaynak (1996) examined how a salesperson's accent can affect purchase decisions. They found that, in an American context, American-accented-English salespersons produced more favourable purchase decisions than Cuban or Nicaraguan-English-accented salespersons.

Thomas (1999) and McLean (2007) discussed the effects of a non-native accent in the scholastic field and found that many educators are perceived as less credible because of their accent. A lower perception of credibility in this context can have a profound negative effect, as professors and teachers need to present themselves as authoritative and trustworthy sources.

Dixon et al. (2002) performed a study on accents and law, in particular examining the attribution of guilt. They found that the regional accent of Birmingham English was rated as significantly 'guiltier' than a standard Received Pronunciation (RP) accent. Frumkin (2007) used the matched-guise technique to compare the effect of German, Mexican Spanish, and Lebanese Arabic-accented English with "accent-free" English in mock eyewitness testimonies. She also found that foreign-accented speech was perceived less favourably than native-accented speech.

This study specifically investigates the impact of accented speech on the believability of the message, which in turn directly affects the perceived credibility of the speaker. The aim is to uncover whether accents affect perceptions of credibility in New Zealand. This study is also interested in whether the *degree* of accent influences perceptions of credibility. That is to say, is a speaker with what might called a 'heavy' accent perceived differently to a speaker with a so-called 'milder' one? Furthermore, if perceptions of credibility *are* influenced by accent, then what is the cause of this effect? Some previous research has suggested that if

foreign accents are perceived more negatively, it is due to the stereotypes associated with the accent, while others have argued that this effect is due to increased cognitive demands. I explore this issue in this thesis, and I return to a discussion of it in the literature review.

The approach of this study employs a previously used methodology that tests whether unusual trivia statements are more likely to be believed when spoken in a native accent vs a non-native accent of English (Lev-Ari & Keysar, 2010; De Meo, Vitale, Pettorino, & Martin, 2011; Souza & Markman, 2013; Stocker, 2016; Hanzlíková & Skarnitzl, 2017). A total of 54 listeners listened to a series of trivia statements read in New Zealand English, Scottish accented English and Chinese accented English, and indicated the veracity of each statement on a scale. This study provides some insight into the influence accent has on perceptions of credibility.

The thesis is structured as follows. In the literature review in chapter 2, I first review the existing literature of this topic and then briefly describe accents which are examined in this study. Then in the methodology in chapter 3, I describe the process of conducting a pilot study, the selection and recording speakers, and the procedure and details of the perceptual task. In chapter 4, I describe the process of analysing results and display their visualisations. In the discussion in chapter 5, I discuss the results in light of the previous literature. Finally, in chapter 6, I conclude this thesis and provide some recommendations for further research.

Chapter 2

Literature Review

2.1 Background

As noted above, research by Lev-Ari and Keysar (2010) has promoted research on the relationship between accent and credibility. Multiple further studies have been conducted to test their findings (De Meo, Vitale, Pettorino, & Martin, 2011; Souza & Markman, 2013; Stocker, 2016; Hanzlíková & Skarnitzl, 2017). There have been varied results produced by these studies which have all researched different aspects of a similar overarching question in different contexts. Because of the variations within the findings of these studies which all implemented a similar methodology, it is useful to review in some detail the findings of each of these studies. These studies provide an important background for the current study and have helped to formulate the research topic and questions which are still unanswered. Here I first discuss Lev-Ari and Keysar (2010), before turning to those studies that have attempted to replicated those results.

Lev-Ari and Keysar (2010) provide a foundation for researching this topic. Their approach and the basis of their methodology has been adopted by many others, including the present study. Their experiment design involves participants listening to a number of rather obscure trivia statements, such as "*A mosquito has 2 teeth",* spoken by a range of speakers, some native and some non-native (Lev-Ari & Keysar, 2010, p.1094). The idea of course is that most people generally do not know how many teeth a mosquito has, or whether they have any teeth at all. However, they might believe the statement if someone were to tell them, even if that person was not a zoologist. A total of 30 native American English listeners heard a total 45 statements and judged the veracity of each immediately after hearing it. Results showed that sentences spoken in 'accented' speech – the speech of non-native speakers - were rated as less truthful when compared with native speech.

Lev-Ari and Keysar (2010) argue that it is not the prejudice associated with an accent which impacts the credibility of the speaker, but rather the difficulty of processing the accented speech. In an attempt to explore this, before beginning the experiment, Lev-Ari and Keysar instructed listening participants to first serve as "speakers" themselves, and record five trivia statements each. These recorded statements were supposedly to be used for future participants. This was to show participants that all the speakers they were about to hear were simply

messengers who were delivering a message from a native speaker and not conveying information from their own knowledge. Lev-Ari and Keysar (2010) claim that if people find the message less believable when the *messenger* has an accent, then the judged credibility is impacted by the *processing fluency* of the speech, not by prejudice.

However, it seems bold to claim that by telling participants the speakers were only messengers links to stereotypes and the prejudice associated with the accent would truly be removed. It is a well-documented idea that foreign accents trigger stereotypes (Giles, 1970; Ryan, 1972; Tsalikis, DeShields, & La Tour, 1991; Nejjari, Gerritsen, Haagen, & Korzilius, 2012; Neuliep & Speten-Hansen, 2013). Even though the participants were informed that statements were only recited and did not reflect the speaker's academic competence, subconscious stereotypes may have nevertheless played a role. This is because attitudes, which are based on cognitive connections and pre-existing stereotypes, may have influenced credibility ratings (Stocker, 2016). If links to stereotypes were not completely removed by this methodology, there are further potential problems when considering the accents used.

Lev-Ari and Keysar (2010) used a total of nine speakers - three native English speakers, three non-native speakers of English with what they call a 'mild' accent, and three non-native English speakers with a so-called 'heavy' accent. For the mildly accented condition, the accents of the speakers were Polish, Turkish, and Austrian, while the heavily accented condition speakers were Korean, Turkish and Italian. Each of these five different accents can have very different stereotypes associated with them. If the associated prejudice did affect listeners' ratings of the statements' truthfulness, then this range of accents would likely influence the listeners in different ways.

This becomes even more problematic when considering previous work which has shown that less-familiar accents are perceived as less credible (Dahlbäck, Wang, Nass, & Alwin, 2007; Frumkin, 2007). Research by Dahlbäck et al. (2007) has shown that it may not be the "incorrectness" of a foreign accent that causes listeners to rate the speaker as less credible, but rather, it may be as a result of dissimilarity of the accents. For example, Dahlbäck et al. (2007) demonstrate that people tend to perceive speakers who have a similar accent to them as more reliable. They call this phenomenon the 'similarity-attraction effect'. In Lev-Ari and Keysar's (2010) study, and any perceptual study researching the effect of accents, listeners are likely to have different levels of familiarity with accents they hear, and thus some accents might seem less 'heavy' to them compared with other listeners. Lev-Ari and Keysar (2010) did not

report on the listener background and whether listeners were more familiar with any of accents that they heard in the study. Stereotypes may differ depending on the listeners' previous experiences, as well as linguistic and cultural backgrounds (Kristiansen 2001; Ladegaard 1998).

There is also a lack of detail provided in Lev-Ari and Keysar (2010) about the background of the speakers used to produce the audio stimuli. In particular, there is no mention of whether the speakers were male or female. Details such as speaker gender and age can also have a major influence on listeners' perceptions of credibility and are topics which on their own have been researched thoroughly (Pearson, 1982; Weibel, Wissmath, & Groner, 2008; Brann & Himes, 2010). For example, Boyle (2014) found that male voices were viewed as more credible expert witnesses than female voices.

Not only could familiarity with the accent have affected listeners' perceptions, but also familiarity with the spoken statement itself. Lev-Ari and Keysar (2010) reported that half of the trivia statements used in their experiment were in fact true and the other half were in fact false. However, the actual truthfulness of the statements is not as important as the *perceived* truthfulness. Some of the statements may inherently sound more believable, due to the general knowledge or beliefs of the listening participants. For example, the veracity of the statement "the sound heard by a listener when holding a seashell to his ear is the echo of the blood pulsing in the listener's own ear" may be more well known than the statement "earthworms have five brains".

When researching the effects of an accent, it is important to be aware of all the factors which can play a role in forming perceptions. The statement "Woes unite foes" is perceived as a more accurate description than "Woes unite enemies" because of the rhyming of the words *woes* and *foes* (McGlone & Tofighbakhsh, 2000). Other more visible aspects, such as the font used to record the word, can also affect the perceived truthfulness of a written statement (Reber, Schwarz, & Winkielan, 2004). Thus, it is important to consider the statements themselves and not only the accents and voice of the speaker who articulates it. As the 45 trivia statements used by Lev-Ari and Keysar (2010) were divided between the speakers within the three groups (native accented speakers, mildly accented speakers & heavily accented speakers), it is possible that the statements which were spoken by some speakers were inherently more likely to be perceived as true, regardless of the accent in which each statement was spoken.

Lev-Ari and Keysar (2010) conducted a second part to their experiment, which tested whether participants *knowing the aim of the research* had any effect on the outcome. This

second experiment was identical to the first except that before beginning the task, participants were told that "the experiment was about the effect of the difficulty of understanding speakers' speech on the likelihood that their statements would be believed" (Lev-Ari & Keysar, 2010: 1095). Also, the trivia statements were presented in blocks by speaker and after listening to all the statements spoken by them, participants rated the difficulty of understanding the speaker.

The results from this second experiment showed that only the 'heavily accented' speech was perceived as less truthful, and there was no difference between the mild and native accents. It is suggested by Lev-Ari and Keysar (2010) that, when participants were told that the difficulty of processing accented speech could impact their judgements towards the truthfulness of each statement, they attempted to avoid this misattribution. They concluded that listeners succeeded when the speaker had a mild accent but were unable to counteract the impact of processing difficulty when it came to the statements from heavily accented speakers.

Lev-Ari and Keysar's (2010) study has stimulated further research into the relationship between accent and credibility. Further studies have used similar methods across various different contexts. De Meo, Vitale, Pettorino and Martin (2011) researched this effect in the Italian context. They tested the influence that Chinese accented speech had on the perceived truthfulness of news items in comparison with native Italian accented speech. For each accent, a male and female speaker were recorded. Before the perceptual task, a group of 70 native Italian listeners judged the degree of accent for both the Chinese accented speakers. The female voice was judged to have a strong foreign accent, while the male voice was judged to have a mild accent (De Meo et al., 2011, p. 1366). However, for the native accent condition, there was no difference in strength of accent across the two speakers reported by De Meo et al. (2011).

A total of 300 native Italian participants listened to 12 "bizarre-but-true" news items from around the world read in Italian by the four speakers, and then indicated whether each news item was true or not (De Meo, et al., 2011). Results showed no significant overall difference between the native and non-native accent conditions. However, results did show that each single piece of news had its own degree of credibility. To further examine the results, De Meo et al. (2011) tested whether certain suprasegmental features had an effect on a listener's perceptions of credibility. They found that a reduced tonal range and longer silent pauses led to a significant increase in listener trust. Although suprasegmental features such as these are independent of the accent, it is important to note that certain features such as longer silent

pauses are perhaps likely to be more common among non-native speakers with a lower level of competence.

The main focus of De Meo et al. (2011) was to test whether, as claimed by Lev-Ari and Keysar (2010), characteristics of the voice signal result in difficulty in processing and thus a decrease in perceived credibility. Therefore, the experiment design did not account for other factors which could be affecting listener perceptions. For example, male and female speakers were both used as voices in the speech stimuli which is problematic for reasons previously discussed. De Meo et al. (2011) also ignored the potential influence that the associated stereotypes of the Chinese accented speakers could have in the listeners' perceptions. As the results showed significant differences of perceived credibility for individual news items, De Meo et al. (2011) acknowledge that this is likely to be due to the textual content. Therefore, it is possible that the content of the news item, combined with preconceived perceptions of the speakers, could have influenced their findings. Perhaps particular news topics are more believable to Italian listeners when said in a Chinese accent. It is difficult to determine an overall trend with such a small number of news item tested.

A study by Souza and Markman (2013) also attempted to replicate the results found by Lev-Ari and Keysar (2010). The core focus of their experiment was that, if as claimed by Lev-Ari and Keysar (2010), processing fluency influences people's perceptions of credibility, then other manipulations of the speech signal, such as adding background noise, should also influence listeners' judgements of truth (Souza & Markman, 2013, p.1360). Like Lev-Ari and Keysar (2010), the study was conducted in the USA with native English-speaking listeners. To research this effect, Souza and Markman (2013) conducted three different studies.

The first study was designed to test whether white noise or babble noise would affect participants' ratings of truthfulness. The study used a total of 70 trivia statements (48 experimental ones and 22 fillers) which were similar to those used by Lev-Ari and Keysar (2010). These were recorded by a female native English speaker, and then mixed with background noise at four different sound-to-noise ratios. These statements were listened to by a total of 38 participants (26 in the white noise condition, and 12 in the babble noise condition) (Souza & Markman, 2013). Participants indicated the truthfulness of each statement on a scale of 0 (definitely false) to 10 (definitely true).

In order to ensure that the noise manipulation did in fact cause the statements to be more difficult to understand, a separate group of 24 participants listened to statements with the

background noise and rated the degree of difficulty to understand each statement. The results of this manipulation check did reveal a reliable effect of noise with statements that had a higher level of noise being perceived as more difficult to understand (Souza & Markman, 2013, p.1361). However, the findings for both the white noise condition, as well as the babble noise condition, showed that the mean truthfulness ratings did not differ significantly across the different levels of background noise. Souza and Markman (2013) claim that, because processing fluency associated with auditory stimuli did not influence participants' judgements of truthfulness, their results contradict the claims by Lev-Ari and Keysar (2010).

As the findings of their first experiment went against those which were claimed by Lev-Ari and Keysar (2010), Souza and Markman (2013) conducted a second study, this time in a direct attempt to replicate the findings of Lev-Ari and Keysar (2010). This second study used the same 70 trivia statements used in their first study. However, this time the statements were read by one female native English speaker, two female native speakers of Brazilian-Portuguese, and two female native speakers of Korean. A total of 65 native English-speaking participants listened to the trivia statements (16 spoken by a native speaker of Brazilian-Portuguese, 16 by a native speaker of Korean, and 16 by a native English speaker). An additional 20 filler statements were also included, which were read by an additional two native English speakers. Participants rated the veracity of each statement on a scale ranging from 1 to 10.

The results of this second study once again failed to replicate the findings of Lev-Ari and Keysar (2010). Although the foreign accented speech was perceived to be more accented compared with the native accented speech (rated by a separate pool of participants), the accent did not have any effect people's perceptions of truthfulness.

However, as the main claim of Lev-Ari and Keysar (2010) was that it is not necessarily the accent itself which drives the misattribution effect, but the associated difficulty in processing the speech, Souza and Markman (2013) assumed it reasonable that although the foreign accented speech had been rated as more accented it may not have been difficult enough to understand. Therefore, a third study adopting a new methodology was conducted to further explore this point.

Three female native speakers of English as well as three female non-native speakers of English made up of a Brazilian Portuguese accented speaker, an Iranian accented speaker and a Korean accented speaker recorded both positive and negative reviews for six different products (Souza & Markman, 2013). These reviews were then rated by a group of 24

participants for both the level of accentedness and the difficulty in understanding. These ratings confirmed that the non-native reviews were indeed more accented and more difficult to understand.

A total of 60 participants were presented with a series of specifications about a product. They then listened to a consumer review about the product in one of the native vs non-native voice conditions and estimated how much they thought the product should cost. Participants were given a range of estimate prices for each product. However, although the non-native speakers' speech was perceived as accented and more difficult to understand, they did not influence participants' price estimations.

Both De Meo et al. (2011) and Souza and Markman (2013) failed to replicate or give any support toward the findings of Lev-Ari and Keysar (2010). However, the methodology used by these studies was not identical to that which was used by Lev-Ari and Keysar (2010). For example, these studies both used different accents and methods for collecting credibility ratings. Furthermore, neither of these studies use the same statements to those used by Lev-Ari and Keysar (2010).

Stocker (2016) acknowledges the contradictory outcomes presented across these studies. In an attempt to provide more clarity, Stocker (2016) adopted the methodology of Lev-Ari and Keysar (2010), with a few minor modifications, and investigated this study in the Swiss context. The main aim was to discover whether foreign-accented speech gives rise to processing difficulties which affects credibility. However, Stocker (2016) does also recognise that the distinct stereotypes associated with the different speakers in her study could play a role in the ratings of credibility.

The experiment was conducted online in German and French. The trivia statements used, as well as the instructions given to participants, closely followed those which were used by Lev-Ari and Keysar (2010). The main point of difference between the two studies was that, while Lev-Ari and Keysar (2010) differentiated by degrees of accentedness (mild, heavy, native), Stocker (2016) focused on the different types of accents (Italian, English, Swiss-German, and French). Eight speakers (two native Swiss-German, two native English, two native French, and two native Italian speakers; one male and one female for each language) recorded all 48 trivia statements in both German as well as French (Stocker, 2016). The statements were listened to by 419 participants (215 participants in the French condition and 204 in the German condition). Each participant rated the truthfulness for each statement on a

scale similar to that used by Lev-Ari and Keysar (2010). Even though the results of a pilot study suggested that the foreign-accented statements used were less intelligible and therefore should inhibit processing fluency, credibility ratings were found to not be significantly affected by the accent condition in both the French and German surveys (Stocker, 2016). No difference was found between native and foreign accents, nor was there a difference found between foreign accents either.

It is recognised by Stocker (2016) that one reason for the lack of effect could be due to the rich linguistic background of the participants. Stocker (2016) reports that most raters claimed to have competencies in more than one L2. The linguistically rich context of Switzerland makes it likely that most participants were familiar with the majority of the accents used in the study (Italian, English, Swiss-German, and French), which are all languages widely spoken in Switzerland. This is a major point of difference when compared with the accents used by Lev-Ari and Keysar (2010) (Polish, Turkish, and Austrian, Korean, and Italian) which are not widely used in the United States of America (USA). Stocker (2016) does make the point that familiarity with foreign accents does not necessarily imply that attitudes are more positive towards the speaker with those accents (see Dewaele & McCloskey, 2014). Nevertheless, if stereotypes were having an effect, it should be considered which stereotypes are at play.

The similarity attraction effect (Dahlbäck et.al, 2007) may have had an influence here. Dahlbäck et.al (2007) found that American listeners preferred an American accent over a Swedish accent, while Swedish listeners preferred a Swedish accent over an American accent. Participants in Stocker (2016) may have viewed all the "foreign accents" as "in-group members", while participants in Lev-Ari and Keysar (2010) may have viewed the speakers as "out-group members". Social identity theory suggests that belonging to a group confers a special social identity and comparison with one's own in-group often results in negative attitudes and unfavourable comparison of outsiders (Bresnahan et al., 2002, p.172).

The most recent study to further test the findings of Lev-Ari and Keysar (2010) was Hanzlíková and Skarnitzl (2017). In their experiment, the methodology of Lev-Ari and Keyser (2010) was once again implemented, but with yet another shift in focus. Instead of investigating *native listener* attitudes towards non-native accents, Hanzlíková and Skarnitzl (2017) researched the perceptions of *non-native listeners* towards both native accented speech as well as non-native accented speech. With the exception of a few minor adjustments to ensure the non-native listeners would fully understand every trivia statement, the same set of trivia

statements as Lev-Ari and Keysar (2010) was recorded by 12 different speakers. These speakers were made up of four groups, two of which were native English speaker groups (three native British English speakers and three native American English speakers) (Hanzlíková & Skarnitzl, 2017). The third group consisted of three native Czech speakers of English, and the final group was made up of three more foreign accented speakers (French, Egyptian Arabic, and Russian), who were reported to have a comparable degree of *accentedness* compared to the Czech speakers (Hanzlíková & Skarnitzl, 2017).

The trivia statements were listened to by native speakers of a range of languages including Polish, Russian, Ukrainian, Slovak, and Hungarian. However, the majority of listeners were native Czech speakers (Hanzlíková & Skarnitzl, 2017). In total these listeners made up 121 participants who were told, as in Lev-Ari and Keysar (2010) that the speakers they were going to hear had only read a list of statements prepared by the experimenters and that they were not expressing their own knowledge. The participants were told to focus on the content of the statements (Hanzlíková & Skarnitzl, 2017).

The findings of Hanzlíková and Skarnitzl (2017) support the results of Lev-Ari and Keysar (2010). The perceptual experiment's results suggest that foreign-accented speech negatively influences the perceived truthfulness among non-native listeners of English. The native British English speaker group was rated as the most credible, followed by the native American English speaker group, then the native Czech speaker group, and finally the other mixed non-native speaker group. While Hanzlíková and Skarnitzl (2017) did find an effect where non-native accented speech is perceived as less credible, they do not directly comment on whether they believe this effect to be a result of difficulty in processing fluency. However, they instead focus on the relevance that their results have in the context of international communication. Hanzlíková and Skarnitzl (2017) conclude that their results demonstrate that non-native listeners are also sensitive to non-native English and that subconscious attitudes to language varieties are thus relevant in the context of international communication (p. 297). This suggests that they attribute the effect to associated stereotypes and not to difficulty in processing fluency.

To summarize the findings of the literature which has been discussed, Lev-Ari and Keysar, (2010) as well as Hanzlíková and Skarnitzl (2017) both found that native accented speech was perceived to be more credible than non-native accented speech (by native listeners as well as non-native listeners). These studies were conducted in the USA and the Czech

Republic respectively. However, only Lev-Ari and Keysar (2010) claim that their findings are a result of difficulty in processing fluency, rather than resulting from any associated stereotypes. On the other hand, neither the results of De Meo et al. (2011), Souza and Markman (2013), or Stocker (2016) showed any significant effect when comparing the perceived credibility of native vs non-native accents. These studies were conducted in the Italian, USA, and Swiss contexts respectively. Souza and Markman (2013) also could not re-affirm the claim by Lev-Ari and Keysar (2010) that processing fluency affected participants' perceptions of credibility when they tested this theory with other external factors outside of the accent which would affect listeners ability to process the speech.

However, there is a major piece of potential influence across all of these studies and it has not been satisfactorily taken into account - namely the influence of listener background. It is suggested by Stocker (2016) that close attention should be paid to participants' profiles, as this could be linked to the ambiguity and the complexity of attitudes towards foreign accents (p.626). Many of the previous studies performed some kind of external experiment to test whether the accents in question were in fact more accented and more difficult to understand. However, in each case, this task was completed by a separate group of participants to those who took part in the main perceptual task of each experiments. Therefore, there was no way of knowing whether an individual participant's difficulty in understanding had an effect on ratings of credibility. Other aspects of listener background such as their familiarity with the accents in question have also been largely ignored. This was recognised by Stocker (2016) as a potential influencer, but not extensively explored.

Across these studies, there have also been inconsistencies in the gender of the speakers. Some have looked at the degree of accentedness, while others have focused on different language groups. As a reminder, these are important issues to be aware of due to the potential influences which can be associated with a person or accent.

Based on the literature, it appears that further research is still needed to explore how accent affects perceptions of credibility. There seems to be two principal areas of contention:

> Firstly, does non-native accented speech have an effect on perceptions of credibility? Secondly, if non-native accented speech *does* have an effect on perceptions, then is this effect a result of difficulty of processing fluency or is this effect purely due to pre-existing stereotypes?

It is of course possible for both of these effects to be at work. It also seems that from the results found in the literature, that the context in which the experiment is conducted as well as the particular accents which are examined can play an important role determining judgements of credibility. This study aims to further investigate the effect which accent plays in listener perceptions of credibility in the New Zealand context.

This study builds on the methodology by Lev-Ari and Keysar (2010) as well as the studies that have followed. I use the same trivia statements which were used by Lev-Ari and Keysar (2010), but also include additional similar trivia statements to the original set in order to increase the amount of data collected. These statements are first tested for perceived truthfulness, via a separate task, before any accent variable is introduced.

A focus of the present study is to consider variation not only among non-native speakers, but among native speakers as well. Lev-Ari and Keysar (2010), as well as De Meo et al. (2011), both considered the effect to which the degree of an accent can have on perceptions of credibility. However, they ignored the range of accentedness which is present within native accents themselves, which can also influence perceptions of credibility (Dixon et al., 2002). This study researches both non-native accented speech, as well as native accented speech, by testing 'mildly accented', as well as 'strongly accented' speech for the Chinese, Scottish and New Zealand accents. In order to thoroughly investigate the role of processing fluency and pre-existing prejudices on perceived credibility, the associated stereotypes for each of the accents in question are explored.

As previously mentioned, one of the main goals of the current study is to investigate Lev-Ari and Keysar's (2010) claim that difficulty in processing fluency affects perceptions of credibility for non-native speakers. This claim is not without support from other studies which have indicated that information that is easier to process is perceived as more truthful (e.g. Unkelbach, 2006; Oppenheimer, 2008; Reber & Unkelbach, 2010). Other studies such as (Ryan, 1983; Giles, Hewstone, Ryan, & Johnson, 1987; Cargile & Giles, 1998) present evidence that more intelligible foreign accents are viewed more positively. Similarly, White & Li (1991) predict that listeners having difficulty in understanding a speaker are likely to experience a negative effect. Therefore, if as claimed by Lev-Ari and Keysar (2010), it is the difficulty in processing the spoken statement which causes the listener to perceive the speaker as less credible, then listeners who find Scottish-accented English as difficult to understand should

rate it as less credible, even though the associated stereotypes in New Zealand toward speakers of Scottish accented English are generally positive.

This paper seeks to answer the following research questions:

1) In a New Zealand context, is there a difference in perceived credibility across the three accent groups (New Zealand, Chinese and Scottish)?
    1a) Is there any difference in perceived credibility between the 'heavy' and 'mildly accented' speaker of each accent group?
2) Is there evidence which suggests that processing difficulties affect perceptions of credibility?
3) How do associated stereotypes interact with perceptions of credibility?

I hypothesise that the New Zealand accented speaker with a mild accent will be rated as the most truthful followed by the heavily accented New Zealand speaker. This trend of mild accents being rated as more credible than heavy accents should be consistent across all accent conditions. Scottish speakers as well as the Chinese speakers will be rated as less credible than the New Zealand speakers. I expect that stereotypes will be more prevalent among the Chinese accented speakers and cause listeners to perceive them as less credible due to the non-native cues which is associated with the Chinese accent. However, if difficulty in processing fluency plays a role, as claimed by Lev-Ari and Keysar (2010), then the Scottish accent may also be perceived as less credible -similar to the Chinese accent. This will depend on how ratings of truthfulness interact with ratings of difficulty in understanding as well as ratings of familiarity.

2.2 Overview of the accents investigated

If associated stereotypes do play a role in the effect accent has on perceived credibility, it is important to discuss these stereotypes in relation to the accents used in the context of the current study. This is particularly important to investigate considering that the majority of the studies which have been discussed, with the exception of Stocker (2016), did not consider the influence of stereotypes in their methodology. These previous studies have researched a variety of different accents in a variety of contexts. As noted, this study investigates the Chinese, Scottish and New Zealand accents in the setting of Christchurch, New Zealand.

As Lev-Ari and Keysar (2010) specifically explored the perceptions of *non-native accents*, it is important that a non-native accent is included in the current study. It seemed that in the New Zealand context, the Chinese accent was most relevant non-native accent to be studied. The Chinese population is rapidly growing in New Zealand, with the 'Asian' population (the majority of whom are Chinese) projected to become the second largest population in New Zealand by the early 2020s (Statistics New Zealand, 2013b). In general, most New Zealanders (71%) have positive attitudes towards people from Asia (Asia New Zealand Foundation, 2016). However, Sibley, Stewart, Houkamau, Manuela, Perry, Wootton, & Asbrock, (2011) report that, although Asian New Zealanders are seen as highly 'competent', they are viewed as less 'warm' relative to other ethnic groups (p.32).

As can be expected with any ethnicity, there are certain folk stereotypes which are associated with the Chinese population in New Zealand. Around the world, Chinese are often stereotyped as 'being intelligent and good at maths' - New Zealand is no exception to this stereotype. This could cause listeners to perceive Chinese speakers as more educated and have jobs higher of the socio-economic index. However, at the other end of the spectrum, Chinese in New Zealand are also often associated with take-away shops. This has caused a widely admitted stereotype for Chinese accented English often being dubbed as 'fish and chip shop English'. If this particular stereotype were to be cognitively triggered, then it would be expected that listeners would perceive Chinese speakers to be less educated and have jobs lower on the socio-economic index.

Across the studies which have been discussed, the only one to investigate perceptions of non-native accents as well as native accents was Hanzlíková and Skarnitzl (2017), who considered both British English and American English. In order to test the effects of stereotypes, it seemed important to include an accent that has drastically different associated stereotypes to the Chinese accent. Thus, the Scottish accent was also chosen as it seemed to be one of the most obvious choices for a native English accent which could be hard for listeners to understand. By including a difficult to understand native accent, it becomes possible to test whether difficulty in understanding affects both native and non-native accents in the same way. In 2013, Scotland was the tenth most common country of birth, with a total population of 25,953 people (2.6%) (Statistics New Zealand, 2013a).

In the South Island of New Zealand, where this experiment is being conducted, there has been a long history of Scottish influence, with a substantial portion of the early settlers to

the region originating from Scotland. This is often seen as a point of pride for many people, and elements of Scottish culture are still present in some areas. However, for most South Island New Zealanders, although 'Scottishness' generally has positive connotations, the Scottish accent is rarely heard. It is expected that stereotypes of Scottish people would in general be more positive compared with stereotype of Chinese.

As did other studies, the current study aims to compare other accent/language groups with the variant most commonly spoken by the listeners. In the current study, this is the New Zealand accent. The New Zealand accent is not liked by all New Zealand people. Some have reported it to be 'annoying' and new articles have even reported that the New Zealand accent is 'killing the news'. Previous research has indicated that RP and American English often outperformed New Zealand English (NZE) in ratings of status (Gordon & Abell, 1990; Bayard, 1990; Bayard, 2000; Bayard, Weatherall, Gallois, & Pittam, 2001; Bayard & Green, 2003). However, Watanabe (2008) performed a study testing New Zealanders' attitudes towards foreign-accented English, as well as NZE itself. The results of Watanabe (2008) showed that a New Zealand accent was most consistently identified and rated best on nearly all traits of solidarity, competence and status. This suggests that New Zealander's attitudes towards the New Zealand accent have been becoming increasingly positive.

Although insights from previous research as well as personal hypotheses can help to understand the stereotypes which New Zealanders could have towards the speakers of these accents, the most accurate information will always come from the participants themselves. Therefore, the current study includes questions targeting participants' views and perceptions of speaker of each accent. The procedure and specific details of this are discussed within the methodology section.

2.3 Accent features

As the current study aims to differentiate between a 'mild' accent and a 'heavy' one, each of the language varieties included in this study (the New Zealand, Scottish and Chinese accents) should be examined to help determine whether they constitute a 'mild' accent or a 'heavy' one. This section briefly describes some of the key features for each of these accents.

2.3.1 The New Zealand accent

When considering the difference in degree of accent within the New Zealand accent, it had to be decided what constituted as a 'heavy' accent in New Zealand. Within a native accent, or arguably any accent in fact, this distinction may not be straightforward. It had to be considered what would constitute as a heavy accent to the targeted listener group. Many New Zealanders are likely to suggest the Māori English accent is 'heavy' when asked to describe a heavy New Zealand accent. However, the Māori accent is very noticeably different from the Pākehā (or New Zealand European) accent. Because of this obvious distinction, using the Māori accent as one of the speech stimuli could invoke very different stereotypes from a standard Pākehā accent. Thus, to make an accurate heavy vs mild accent comparison the same variety of English should be used. Therefore, it was decided that a rural New Zealand accent should be chosen to represent the heavily accented condition and a standard urban speaker should be chosen for the mild New Zealand accent speaker. Some rationale for this decision can be taken from the fact that rural speakers have often been used as informants for researching sociolinguistic variation. An example of this is NORMs (non-mobile older rural males) being used by sociolinguists (Chambers & Trudgill, 1980, p. 33-5) to determine the speakers used to investigate localities in England and Wales which were explored in the Survey of English Dialects (SED) (Stoddart, Upton, & Widdowson, 1999).

When considering the differences between a heavily accented speaker and a mildly accented speaker, although distinguishing consonant features is possible, is seems likely that the most noticeable variation to a listener would exist across the vowels. Hay, Maclagan, and Gordon (2008) describe the relatively front START vowel as one of the most noticeable features of NZE for people from the northern hemisphere. They also describe the mid central KIT as being the vowel which stands out the most in the southern hemisphere. Other notably 'Kiwi' vowels are the raised DRESS and TRAP vowels which often cause confusion for New Zealander traveling overseas (Hay, Maclagan, & Gordon, 2008). As these vowels are some of the most salient features of the New Zealand accent, it would be expected that a 'heavily' accented New Zealand English speaker would use these features to a greater extent. That is to say, the START vowel would be more fronted, the KIT vowel would be more centralized, and the TRAP and DRESS vowels would be higher than a speaker who might be considered to have a 'milder' accent.

2.3.2 The Chinese accent

Chinese English is increasingly recognised around the world as a variety of English spoken by a fast-increasing population in China (Kirkpatrick, 2007). There are many features of Chinese accented English which can be easily used to distinguish between a heavily accented and a mildly accented speaker. However, many of these features are either lexical or syntactic features which would generally not be apparent when speakers are reading prewritten statements. Thus, it is once again highlighted that phonological features are most important for the purposes of this study. Unlike the New Zealand and Scottish speakers used in this study who are native English accented speaker, the distinction between the heavily accented Chinese speaker and the mildly accented Chinese speaker is inherently linked with language proficiency. Speakers who are more proficient in the English language and have stayed in New Zealand for a longer period of time are likely to be perceived by native listeners to have a milder accent.

Deterding (2006) mentions the insertion of an 'extra final vowel' after final plosives as one of the most noticeable features of Chinese English. This is also supported by Siqi and Sewell (2012) who analysed the phonological features of L2 Chinese speakers. Other features which Siqi and Sewell (2012) cover in their analysis are the shortening of diphthongs (such as *stone* being pronounced with a vowel more like [ɒ]), difficulty in pronouncing the post-alveolar fricative /ʒ/, difficulty in pronouncing the voiced dental fricative (often substituted with [z], or [d]), difficulty in pronouncing the voiceless dental fricative (often substituted with [s]), and elision of /t/ and /d/ in past tense forms such as *dropped* and *dreamed*. A speaker with a heavier accent would display more of these features than a mildly accent speaker.

2.3.3 The Scottish accent

Though South Island New Zealanders often have a sense of pride when it comes to the Scottish heritage in cities such as Christchurch and Dunedin, the Scottish accent is not commonly heard. Therefore, because the Scottish accent is not spoken day to day by real people, it is relatively unfamiliar and difficult for many to understand for the majority of New Zealanders. Within the Scottish accent itself there is a complex interplay between two language varieties which are usually referred to as Scots and Scottish Standard English (ScStE) (Chirrey, 1999). Most Scottish speakers operate along a continuum between these two varieties and can use features of both varieties often depending on stylistic and contextual factors though features of Scots are far more likely to be found among working-class as well as older rural speakers

(Chirrey, 1999). Chirrey (1999) also states that Edinburgh can be described as generally more middle-class than Glasgow and therefore overall have more standard accents when compared with speakers from Glasgow (p.224). Stuart-Smith (1999) notes that moving up and down on the continuum between Scots and Standard Scottish English is very common among speakers from Glasgow in particular.

There are a number of phonological features that are characteristic of the Scottish accent. Some examples include the retention of underlying post-vocalic /r/ and the Scottish vowel length rule (Aitken, 1981). However, important for the current study are features which distinguish a mild accent from a heavy one. It seems that, to most who are unfamiliar with the accents of Scotland, a speaker producing more features of the Scots variety would be perceived as a more heavily accented speaker. Stuart-Smith (2008) states that describing the vowel systems of Scottish Standard English and Scots is difficult and complicated. However, Stuart-Smith (2008) does provide a useful table for comparing Urban Scots and Scottish Standard English. This can be seen in Figure 1 below.

Figure 1 – Comparison of Scottish Standard English and Urban Scots vowels

	ScStE	Urban Scots		ScStE	Urban Scots
KIT	ɪ ~ ë	ë ~ë ~ ʌ ~ ɪ	CHOICE	ɔe	ɔe
DRESS	ɛ	ɛ̯	MOUTH	ʌʉ̯	ʉ ~ ʌʉ
TRAP	a	a̯	NEAR	i	i
LOT	ɔ̯	o ~ ɔ	SQUARE	e	e ~ ɛ̯
STRUT	ʌ	ʌ̈	START	a	ɛ̯ ~ a̯
FOOT	ʉ̯	ë ~ ʉ ~ ʏ	NORTH	ɔ̯	o ~ ɔ
BATH	a	a̯	FORCE	o	o
CLOTH	ɔ̯	o ~ ɔ	CURE	jʉ̯	jʉ
FLEECE	i	i	HEAD	ɛ	i ~ ɛ̯
FACE	e	e	AFTER	a	ɛ̯ ~ a̯
PALM	a	a̯	NEVER	ɛ ~ ë	ë ~ë ~ ɪ
THOUGHT	ɔ̯	ɔ	STAY	e	ɔi ~ e
GOAT	o	o	STONE	o	e ~ o
GOOSE	ʉ̯	ʉ ~ ʏ	STAND	a	ɔ̯ ~ a̯
BIRTH	ɪ	ë ~ ʌ̈	OFF	ɔ̯	a̯ ~ ɔ
BERTH	ɛ	ɛ̯ ~ë	DO	ʉ	e ~ ʉ
NURSE	ʌ	ʌ̈ ~ë	happY	e	e ~ë
PRICE	ʌi	ɔi	lettER	ɪ ~ ʌ	ʌ̈
PRIZE	ae	ae	commA	ʌ	ʌ̈

Stuart-Smith (2008) describes several different vowel distinctions between Scottish Standard English and Scots. However, I will only briefly mention those which display the largest difference, and which may be most apparent to a listener unfamiliar with the linguistic situation in Scotland. The ScStE KIT vowel is realised as [ɪ] or [ë], while it is often realised as ë in Scots and in certain contexts (e.g. “milk”, “fill”) it may be lowered and retracted. ScStE generally only has one vowel for LOT/CLOTH/THOUGH, while there is a distinction between the corresponding vowels COT and CAUGHT in urban Scots which are realised as [o] and [ɔ] respectively. Perhaps the most important feature of Scots is the OUT vowel which is realised as /ʉ/ in words like *house*. In contrast, the ScStE realisation is usually high and rounded. Stuart-Smith (2008) notes that the usage of OUT-fronting tends to correlate with social stratification and that middle-class speakers would avoid this usage. However, speakers always show some alternation and never solely use the /ʉ/ variant (Stuart-Smith, 2008). For the purpose of the current study, a more heavily accented speaker would produce more of the Scots variants than a mildly accented speaker.

Chapter 3

Methodology

The methodology used in this study has been based around the experiment design used by Lev-Ari and Keysar (2010). Consideration was also paid to the methodologies of the subsequent studies which have been discussed in the literature review. However, as has been pointed out, there is much opportunity to improve on the methods used in these previous studies. The basic idea behind all of these studies has been to have a group of listeners judge the truthfulness of series of statements spoken in different accents and see whether listeners ratings differ based on the accent they heard. The basics of this methodology is no different in the current study. However, because the current study aims to explore the potential effects of both processing fluency as well as stereotypes, one of the major focuses of the current study has been to set up a methodology which takes into consideration the linguistic background of both the speaker and listener participants.

When examining the different approaches previously used to investigate the influence of accent on perceptions of credibility, using a matched-guise technique was briefly considered. This is an approach often employed in accent research where a single bilingual, or "biaccented" speaker produces all accent conditions to eliminate potential influencing factors such as voice quality, speech rate, and pitch. However, this was ultimately decided against for multiple reasons. The first reason was due to the difficulty in finding a speaker who could produce both light and strong accented versions for each of the accents. An additional reason was the risk that listeners would recognise that the same speaker was used, and it was feared that such listeners would find it unusual hearing one speaker produce multiple different accents throughout the entire task, subsequently possibly having an influence on their reactions and responses. Although a matched-guise technique was not employed, careful consideration was taken to keep the speakers as similar as possible in sociodemographic terms.

Accordingly, six different speakers were used for the six different accents conditions. This has been the approach taken by Lev-Ari and Keysar (2010), De Meo et. al. (2011), Souza and Markman (2013), Stocker (2016) as well as Hanzlíková and Skarnitzl (2017). The speech data, as well as the perception data, was gathered solely for the purpose of this study.

A total of 99 trivia statements, such as "Slugs have four noses", were collected for this experiment. Out of these statements, 45 were identical to those used by Levi-Ari and Keysar

(2010). A further 54 trivia statements were collected by the author. These additional trivia statements were added to the original set to increase the amount of data collected from each participant. The trivia statements were chosen on the basis that the veracity of each statement would be largely unknown by most people. The additional trivia statements collected by the author were also chosen to be of similar content to the original 45 statements.

3.1 The pilot study

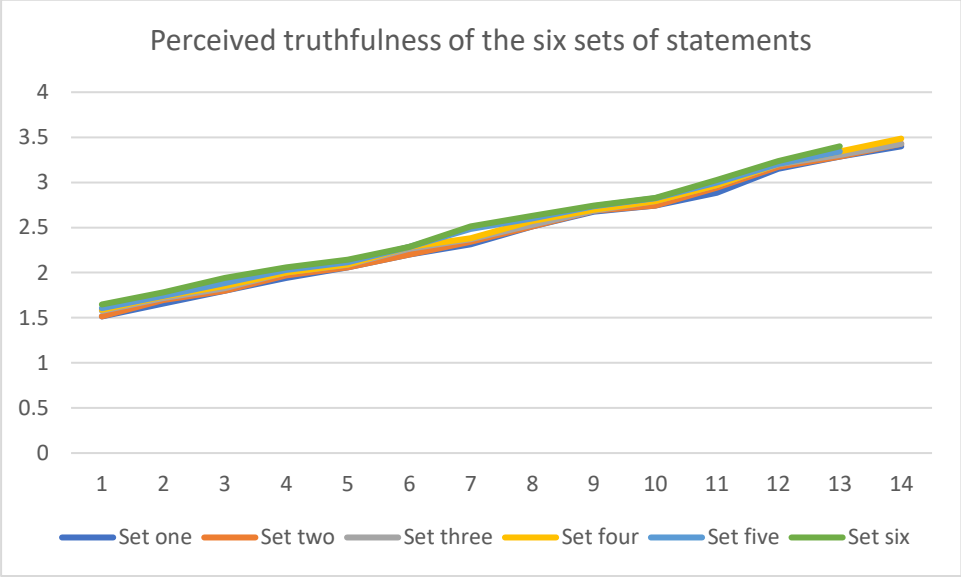
Before carrying out the perceptual task part of the experiment, a pilot study was first conducted. This pilot study did not include audio as a stimulus, and all the trivia statements were presented in a written format which was read by each participant. The purpose of conducting this pilot study was to investigate the perceived veracity for each of the trivia statements and determine whether any particular trivia statements should be removed from the stimulus data.

This pilot study was distributed through an online survey using the Qualtrics Survey Software (2017). In total, 34 raters evaluated the truthfulness of these 99 trivia statements. Participants read each statement and then rated each statement on a 6-point Likert scale, with 0 being ‘definitely false’ and 5 being ‘definitely true’. The mean for each statement was then calculated to determine a ‘perceived truthfulness’ rating for each individual trivia statement. If the ‘perceived truthfulness’ rating of a statement was below 1.5 or above 3.5, the statement was excluded from the data set, as the statements needed to be of a somewhat ambiguous nature so as to be useful in the experiment. This occurred for 17 of the trivia statements, leaving a total of 82 statements remaining. These statements were excluded to help ensure that the statements used in the listening task were statements that were generally unknown to the average person and would have potential to show variation.

The remaining 82 trivia statements were then divided into 6 groups based on their perceived rating of truthfulness. This was done by sorting the statements by their perceived truthfulness rating and then dividing them equally so that each speaker would have an even distribution of statements with a low perceived truthfulness rating and a high level of perceived truthfulness rating. (Recall however that the statements with the lowest and highest truthfulness ratings had already been removed.) Four of the sets contained 14 statements, while the remaining two sets contained 13 statements.

Figure 2 displays the perceived truthfulness rating of each statement used in each set. The Y axis displays the perceived truthfulness rating deducted from the 5-point *Likert* scale. The X axis displays the number of each question for each set. This figure shows that each group of statements had a very similar distribution of perceived truthfulness ratings. This was to help ensured that each speaker was given the same distribution of statements which were less likely to be perceived as true and statements which were more likely to be perceived as true.

Figure 2 – The perceived truthfulness ratings across the six groups of trivia statements



After dividing the 82 trivia statements into six groups, it was possible to assign each set of statements to the speakers. Dividing the trivia statements between speakers based on the 'perceived truthfulness' rating was done to prevent any particular speaker being assigned more trivia statements which were inherently more likely to be perceived as true or false by people in general.

3.2 Production of audio stimuli

As discussed throughout the literature review, much of the previous research on this topic has paid little attention to variables such as age and gender. A special point has been made in this study to reduce as many variables as possible. To this end, all speakers recorded were male and between the age ranges of 21 and 41.

A total of 6 speakers were recorded to provide the speech stimulus in the study. Two L1 speakers of English with a New Zealand accent, two L1 English speakers with a Scottish accent, and two L2 English speakers (L1 Chinese) with a Chinese accented English. For each accent, one of the speakers had a 'heavier' accent and the other had a 'milder' accent (see section 3.3). This somewhat follows the methodology used by Lev-Ari and Keysar (2010) who divided their speakers into the 3 groups - native, mildly accent non-native, and heavily accented non-native. The key difference was that Lev-Ari and Keysar included speakers of different accents within each speaker group, while the current study examines the heavy vs mild versions of the same three accents. By examining the degree of accent within the same accent, the potential for different stereotypes being introduced is reduced.

Even though the total of 99 trivia statements had been reduced to 82 trivia statements following the results of the pilot study, each speaker was still instructed to read the full list in case any of the statements were rendered unusable due to unforeseen circumstances, such as mispronunciations, sound equipment failure, and other issues outside of the author's control. Additionally, speakers read six more 'obvious statements' – statements which I thought everyone would know the answer to - which brought the total to 105 trivia statements. These obvious statements included statements such as, "Wellington is the capital of New Zealand". These six additional statements were intentionally created to have an obvious answer, so they could be used as checkpoints throughout the experiment to test whether the listener participants of the perceptual task were answering each statement honestly and properly participating in the experiment. If listeners did not answer these obvious statements correctly, they could be excluded from the final dataset.

Speakers were instructed to read each statement twice in their natural speaking voice. However, none of the speakers used in this experiment were professional voice actors, and therefore, because of their lack of experience with voice recording, it was not uncommon for some of the speakers to make mistakes, hesitate, and potentially use a stress pattern which is unusual when compared with natural speech. For the majority of the time, these unusual pronunciations were used by the Chinese accented speakers. As each statement was read twice by each speaker, in these cases, the more fluent statement was the one selected for use. Fluency was judged by the author according to the presence hesitations and more typical stress patterns. It was expected that the statements read by the non-native English speakers would be less fluent in general and contain more hesitations and unnatural stress patterns. However, as English is

the second language for these speakers, it can be argued that this is an inherent part of Chinese accented English.

Once the speech data from each of the six speakers was collected, one of the six sets of statements was assigned to each speaker. This was done by considering multiple factors. On occasion, a statement read by a speaker was unusable due to unusual pronunciations, word repetition, or long hesitations. In these cases, the statement was not included in the data set. It was ensured that the set of statements assigned to each speaker was comprehensible (as judged by myself). The features of each accent were also taken into consideration. For example, the statement sets with more post-vocalic /r/ were assigned to the Scottish accented speakers, while statements containing salient New Zealand accent features were assigned to the New Zealand speakers. This was so that the features of each accent would be heard by the listeners and they would then be able to recognise each of the accents.

After recording the total 105 statements, each speaker completed a brief demographic questionnaire which asked questions about their age, ethnic and linguistic background. This information was only used as a comparison between the speakers and to ensure the speakers were as similar as possible.

3.3 Speaker comparisons

Because this study makes a comparison between 'heavily accented' speakers and 'mildly accented' speakers, it is useful to examine some of the important linguistic features of each speaker. These linguistic features helped to determine which speakers had a heavy or a mild accent. The linguistic background of each speaker was also taken into consideration when selecting the speakers.

Drawing a comparison between the two speakers of each accent has its difficulties due to the limited vocabulary used in the trivia statements. This has meant that some of the phonological features which have been described in the literature review which distinguish a heavy accent from a mild one were not possible to analyse. The description in this section is not intended to be an in-depth analysis of these accents, but merely a brief examination to show that there is linguistic evidence which supports that the heavily accented speaker of each pair was indeed more 'accented'.

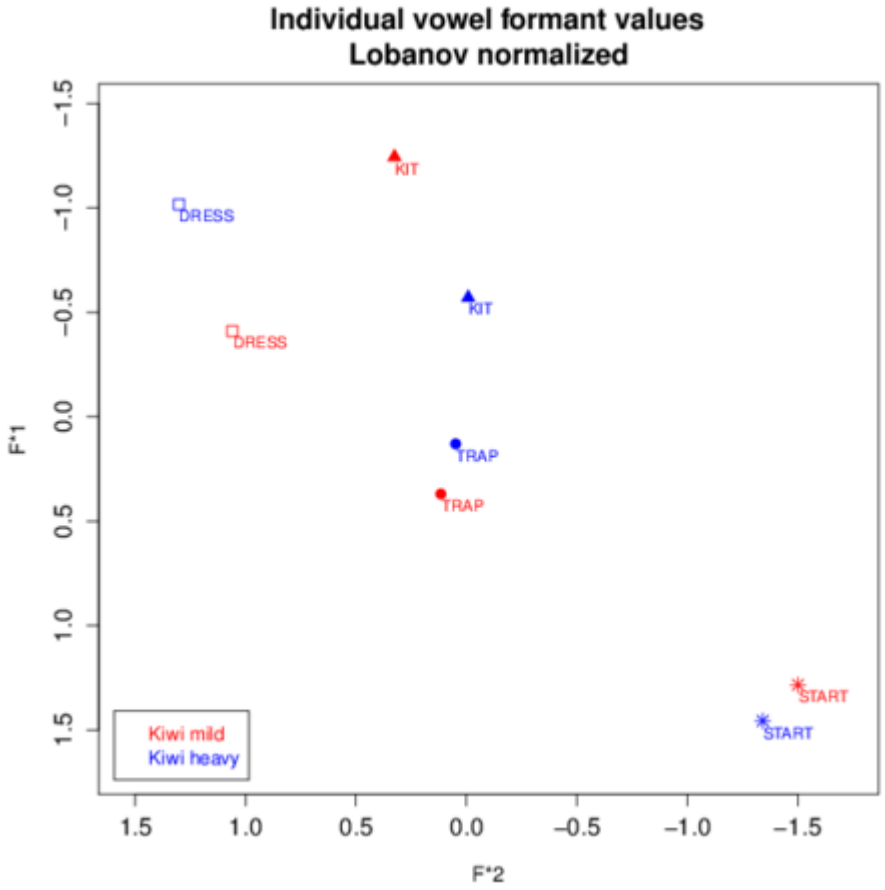
3.3.1 The New Zealand accented speakers

Comparing a heavily accented New Zealand English speaker with a mildly accented New Zealand English speaker was particularly difficult, as there is no agreed upon accent which is perceived by most people to be 'heavy'. However, as established in section 3.2.1, the rural accent would probably best represent the 'heavy' accent condition in this experiment. This speaker grew up in rural South Island, New Zealand. On the other hand, the mildly accented New Zealand English speaker grew up in Wellington, the capital city of New Zealand.

As Hay, Maclagan, and Gordon (2008) suggest that a fronter START vowel, centralised KIT vowel, and raised DRESS and TRAP vowels are some of the most salient features of the New Zealand accent, it seemed reasonable to assume that a heavier New Zealand accent would display these features to a greater degree. This was tested by extracting the average F1 and F2 values for the duration of each vowel from each of the speakers using the Praat computer software (Boersma & Weenink, 2018). The vowel averages were taken from within the same words of the same sentences so as to reduce the influence of the surrounding phonemes. These vowel formants were then normalized and plotted onto a vowel chart using the Lobanov vowel normalisation method (Thomas & Kendall, 2007). This vowel plot is displayed below in Figure 3.

Figure 3 displays the TRAP, DRESS, and KIT vowels of the heavily accented and mildly accented New Zealand English speakers.

Figure 3 – Comparison of vowel features between the heavily accented and mildly accented New Zealand speakers



As can be seen in Figure 3, in all cases, the heavily accented New Zealand English speaker displays the more extreme pronunciation of the vowel. The START vowel of the heavily accented speaker is more fronted and the TRAP vowel is more raised. However, the biggest different can be seen in the height of the DRESS vowel, which is much higher than the mildly accented speaker, and the KIT vowel which is comparatively much more centralised. The heavily accented speaker displays more of the salient New Zealand English features. This suggests that, in the linguistic sense, the Kiwi heavy accent is more accented than the Kiwi mild accent.

3.3.2 The Chinese accented speakers

Both of the Chinese accented speakers were born and grew up in northern China and have the same native tongue –Mandarin. However, the mildly accented speaker was older and

had studied English for a longer period of time. Siqi and Sewell (2012) outlined a number of salient phonological features of the Chinese accent, which can be used to analyse the level of accentedness across the two Chinese speakers. Both speakers had difficulty in pronouncing the voiced dental fricative, as well as the voiceless dental fricative on almost all occasions, excluding high frequency words such as 'the' and 'there'. The alveolar fricative /ʒ/ was not present within the trivia statements read by the speakers and was therefore impossible to examine.

Interestingly, neither speaker seemed to elide /t/ and /d/ in past tense forms, such as *dropped* and *dreamed*. However, the heavily accented speaker had much more difficulty pronouncing word final plosives, such as /t/ and /p/ in words, such as "planet" and "frostnip". These final plosives were often elided by the heavily accented Chinese speaker. The mildly accented Chinese speaker had no difficulty in pronouncing final plosives.

Perhaps the most prominent feature of the heavily accented speaker is the shortening of diphthongs. This is one of the features discussed by Siqi and Sewell (2012). This feature can be heard in words such as "striped", which is pronounced more like "stripped", as well as "while" being pronounced closer to "will". Another feature of the heavily accented speakers accent is the occasional insertion of a schwa-like vowel between two consonants. An example of this occurrence is the word "hamsters" being pronounced [hæmᵊstəɹ]. At times this also occurred in word final position after a final plosive ("first" being pronounced [fɜːstᵊ]). This feature was not present within the mildly accented speaker's accent. The mildly accented Chinese speaker made less mistakes overall and had much less difficulty when reading the trivia statements.

3.3.3 The Scottish accented speakers

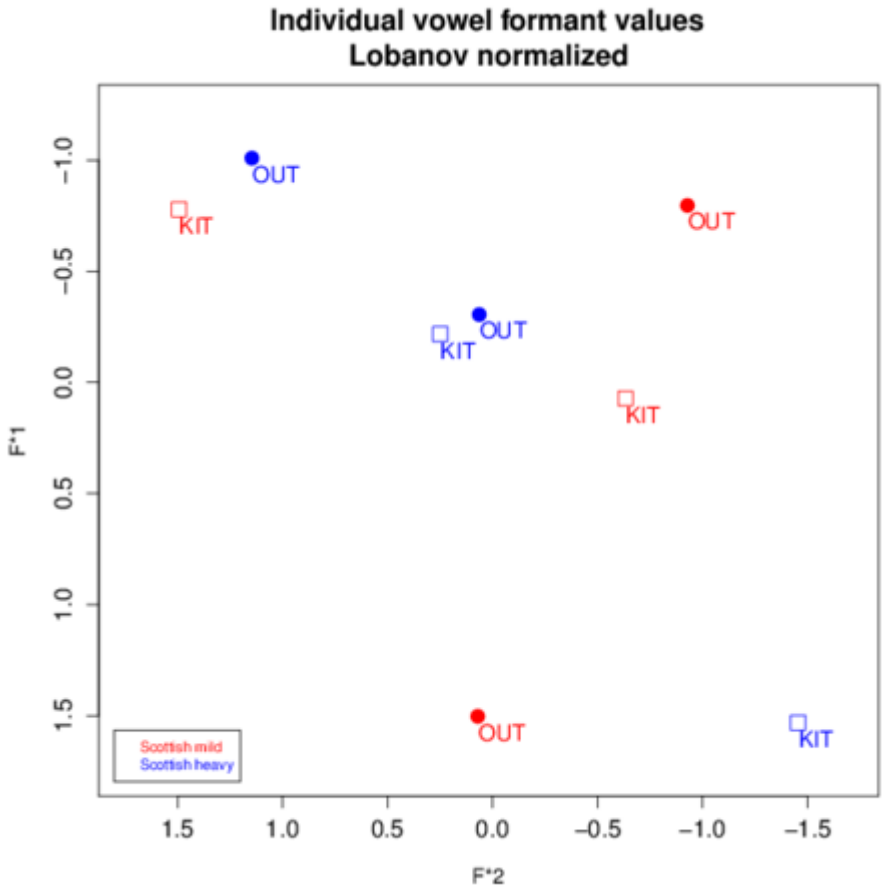
Both of the Scottish accented speakers were born and raised in Scotland and only came to New Zealand as adults. The heavily accented speaker grew up in Glasgow, while the mildly accented speaker grew up in the Edinburgh area. This distinction was specifically made because Chirrey (1999) mentions that the Glasgow accent is likely to be less standard than the Edinburgh accent.

In order to show that the accent of the Glasgow speaker would be perceived as heavier compared to the Edinburgh speaker, two vowel features were measured for a small subset of

these speakers' vowels. Vowels were measured from the words "Stick" and "Out" from within the same four recorded trivia statements for both speakers. This was to see whether the speakers' accents displayed the lowering of the KIT vowel or the fronting of the OUT vowel, which are both features of the Scots rather than ScStE (Stuart-Smith, 2008). It is therefore expected that a heavily accented speaker would have a lower KIT vowel and a fronter OUT vowel which is realised as the monophthong /ʉ/ in Scots. These vowels were plotted on a vowel plot, once again using the Lobanov vowel normalisation method (Thomas & Kendall, 2007).

Figure 4 displays the plotted KIT and OUT vowels for the heavily accented Scottish speaker compared with the mildly accented Scottish speaker.

Figure 4 – Comparison of vowel features between the heavily accented and mildly accented Scottish speakers



As seen in Figure 4, there is some variation within the pronunciation of each vowel. However, overall, the heavily accented speaker has a fronter OUT vowel and a lower KIT vowel than the mildly accented speaker. These are both features of Scots rather than Scottish Standard English, which suggests that this speaker would be perceived to have a heavier accent.

3.3.4 External test for speaker comparisons

Additional to the linguistic analysis provided in this section, the level of accent for each speaker was also judged by four native English speakers, who unanimously agreed that the mildly accented speaker for each pair did in fact have a milder accent. This was done by playing the same statement spoken by both the Chinese accented, Scottish accented, and New Zealand accented speakers to the listeners and asking them to rate the level of accentedness on a scale of 0-7. In all cases, the heavily accented speaker was rated higher on the scale, indicating that the speaker was perceived to have a stronger accent.

3.4 The perceptual task

A total of 54 participants took part in the perceptual experiment. The experiment was conducted at the University of Canterbury, New Zealand. The age range for the listener participants was 18 – 52, with the mean being 24.4. A total of 56% percent identified as female, and 44% percent identified as male. The ethnicity of the listener participants was made of 72.2% New Zealand European/Pākehā, 11.1% Chinese, 9.2% Māori, 5.5% Other Asian, 3.7% Pacifica, 3.7% Indian, and 14.8% Other.

While Lev-Ari and Keysar (2010) only researched native speakers of American English, and Hanzlíková and Skarnitzl (2017) only researched non-native English listeners, the current study did not specify any specific language background requirements for the listener participants. However, details of listeners' linguistic background, as well as their familiarity with foreign accents was included in the questionnaire filled out by each listening participant at the end of the perceptual study.

During the process of recruiting participants, it became apparent that it would not be possible to run the experiment with enough non-native listeners to reach a group large enough to reach statistical significance. Therefore, the perceptual task was closed to non-native

listeners and I focused solely on native listeners from then on. In total, 47 of the listener participants were native English speakers, while 7 were non-native English speakers.

Table 1 – Gender and native/non-native status of listener participants

Row Labels	Non-native	Native	Grand Total
Female	3	27	30
Male	4	20	24
Grand Total	**7**	**47**	**54**

The perceptual study was conducted under the guise of being a "Trivia Challenge". Most of the advertising for the experiment was at the University of Canterbury but also on social media. Most of the participants were then students of the university, but a few non-students also participated in the study. Before beginning the experiment, participants were told they would hear a series of trivia statements and that their task was to identify which trivia statements were true and which were false.

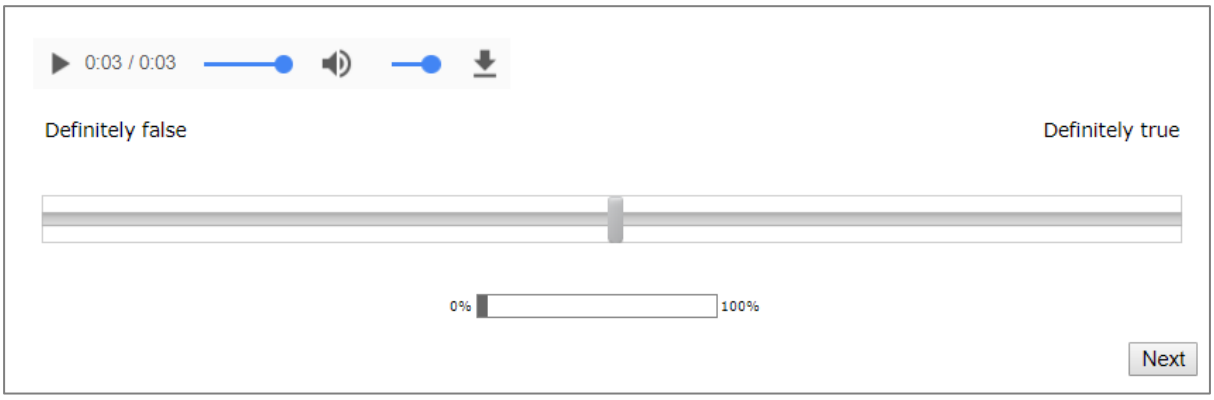
The flow of the perceptual experiment was designed to be similar to those previously conducted. The experiment began with two example written trivia statement with no audio to demonstrate to participants the sort of statements they would be hearing, and the format of the scale. The scale was similar to that used by Lev-Ari and Keysar (2010) with one end labelled "definitely true" and the other end labelled "definitely false". Participants were told that they could answer anywhere on this scale and that they did not necessarily have to answer "definitely false" or "definitely true" for any of the statements, and that anywhere on the scale was acceptable. A Likert scale was not used, as it was believed that this could hide some of the variation within the answers given by participants. Instead, I used a scale ranging from 0 to100. The scale slider's default position was at 50%. However, participants were still required to click on the slider before they could move on to the next statement. This was done to ensure that participants did not skip questions, and that 50% was their actual answer.

Some previous similar studies have included the option of participants to choose 'I know the answer' or 'I did not understand the speaker', instead of rating the veracity of the statement on the scale provided. However, for this study, it was decided to include neither of these options. This is because it was believed number of participants who knew for a fact whether a statement was true or false, should be even across the different speakers' statements.

This is because the statements were divided among the speakers based on the perceived credibility rating which was determined in the pilot study. The option to select 'I did not understand the speaker' was not included due to the fear that participants would opt for this too often. Instead, participants were instructed to replay the statement if they truly did not understand.

Each participant listened to all 88 trivia statements in a random order. The was automatically played for each statement. In total, 15 of the statements were spoken by the mildly accented New Zealand English speaker, 14 were by the heavily accented New Zealand English speaker, 15 were by the mildly accented Scottish English speaker, 15 were by the heavily accented Scottish English speaker, 15 were by the mildly accented Chinese English speaker, and 14 were by the heavily accented Chinese English speaker.

Figure 5 – Screenshot example of the trivia statement question format in the perceptual task



After providing a truthfulness rating for each of the 88 trivia statements, each participant filled out a questionnaire about each of the speakers they heard. The questionnaire for each speaker was presented in a random order for each listener participant. Participants listened to the additional trivia statement, 'Your stomach produces a new layer of mucus every two weeks or else it will digest itself', which was not used in the main experiment. The statement was spoken by each speaker. After listening to this additional audio clip of each speaker, participants were asked where they thought the speaker was from, how educated they thought the speaker was, and what type of jobs people who spoke like the speaker usually have. Participants could select multiple occupations which were taken from the New Zealand socio-economic index (Fahy, Lee, & Milne, 2017). The list included a range of different occupation

titles which each had a socio-economic index (SEI) score, ranging from “Health Professionals” with an SEI score of 74, to “Other Labourers” with an SEI score of 22.

Participants were also asked to rate how accented they found the speaker and how difficult the speaker was to understand on a 7-point Likert scale. These questions were included so that (similar to the third study in Souza and Markman, 2013) the variables ‘difficulty in understanding’ and ‘degree of accentedness’ could be tested for their influence on perceptions of credibility.

Additional to the questionnaires about each of the speakers they heard, participants also filled out a questionnaire about themselves. This questionnaire was designed to find out more about participants’ profiles as was suggested by Stocker (2016). In this questionnaire, participants filled out details on their age, gender, ethnicity, as well as linguistic background. Participants were asked what languages they speak, whether they had lived outside of New Zealand for a period of longer than six months. Participants were also asked about their familiarity with a range of accents including the accents they heard in the experiment but also other accents which were not included in the experiment. Figure 6 displays an example of the final task of the listeners’ demographics questionnaire.

Figure 6 – Screenshot example of the question targeting listener familiarity with each accent

Chapter 4

Results

The results presented in this section are divided into two parts, the first providing an overview of the listener perceptions and the second focusing on the ratings of truthfulness.

4.1 General perceptions of the six speakers

Before analysing the results of the truthfulness ratings, it is useful to first review the results of the questions targeting listener perceptions of each speaker, as well as listener background. This is because certain participants' ratings, such as ratings of difficulty in understanding, as well as attitudes about the speakers' education and jobs, can help to better understand the listeners as a group.

Figure 7 displays the relationship between ratings of accentedness and ratings of difficulty in understanding. The heavy Chinese accent was rated to be the most accented and the most difficult to understand. The New Zealand accent was rated to be the least accented and be the least difficult to understand, while the Scottish accent was rated in between the Chinese and the New Zealand accent. For each accent, the heavy accent was perceived to be both more accented and more difficult to understand.

Figure 7 – Listener ratings of accentedness and difficulty in understanding for all speakers

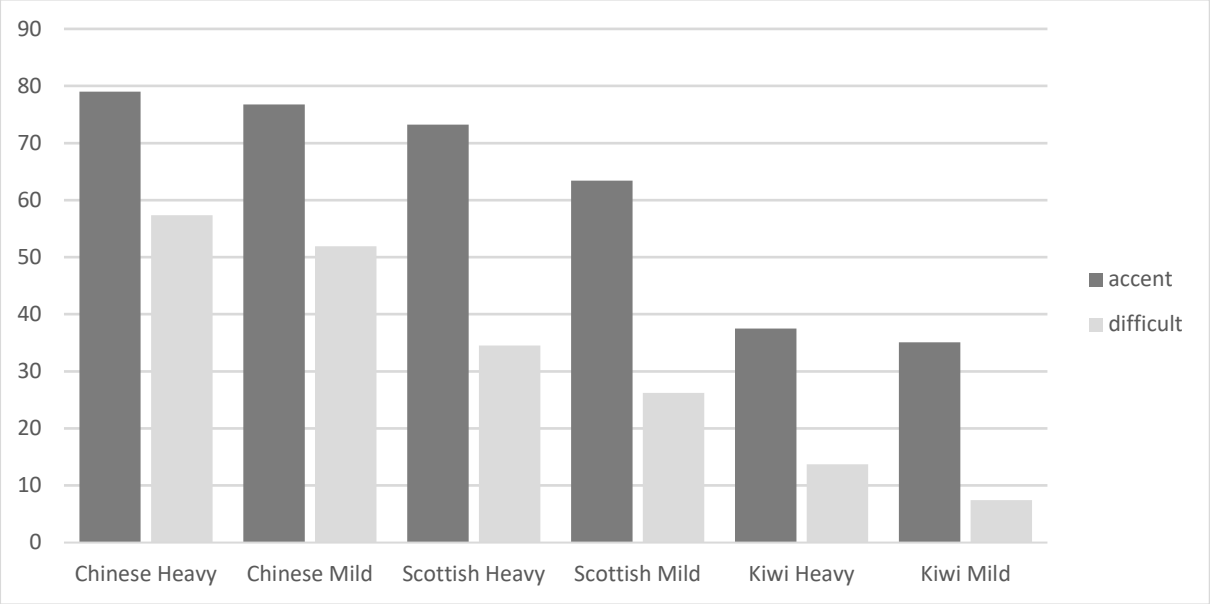


Figure 8 displays the listeners' ratings of familiarity for the New Zealand, Chinese and Scottish accents. Listeners were most familiar with the New Zealand accent, followed by the Chinese accent, and finally the Scottish accent.

Figure 8 – Listener familiarity with the Scottish, New Zealand and Chinese accents

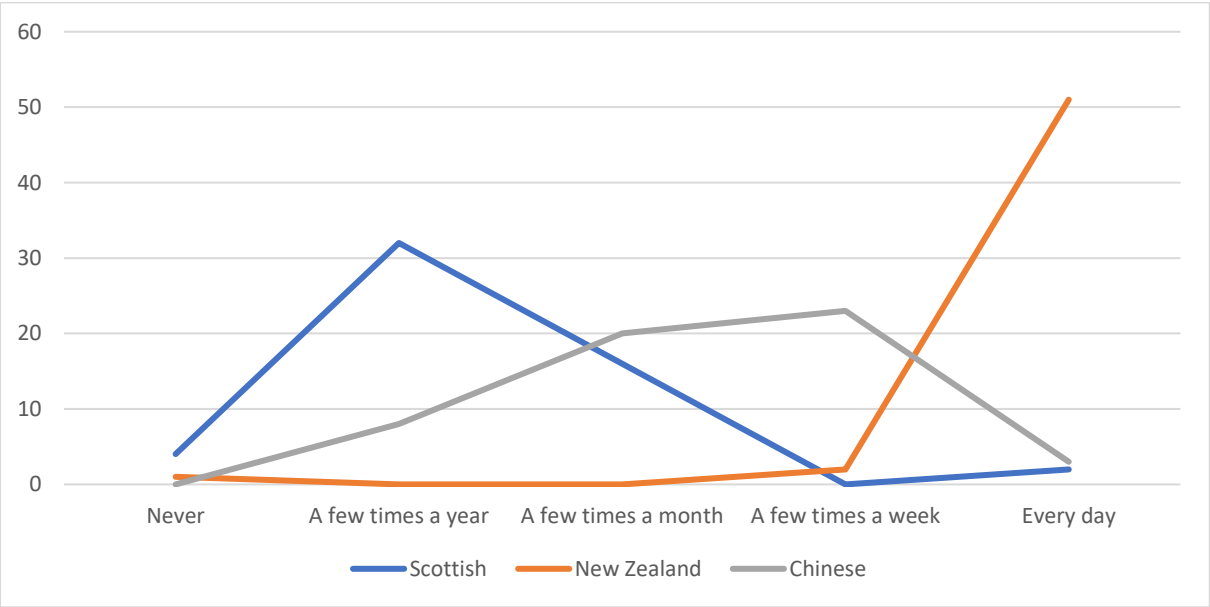


Figure 9 displays the listeners' ratings of level of education for the speakers as grouped by accent. The most noticeable difference is that the Scottish speakers were more likely to be rated to have an Honours degree than an Undergraduate degree when compared with the Chinese and New Zealand speakers.

Figure 9 – Ratings of education as grouped by accent

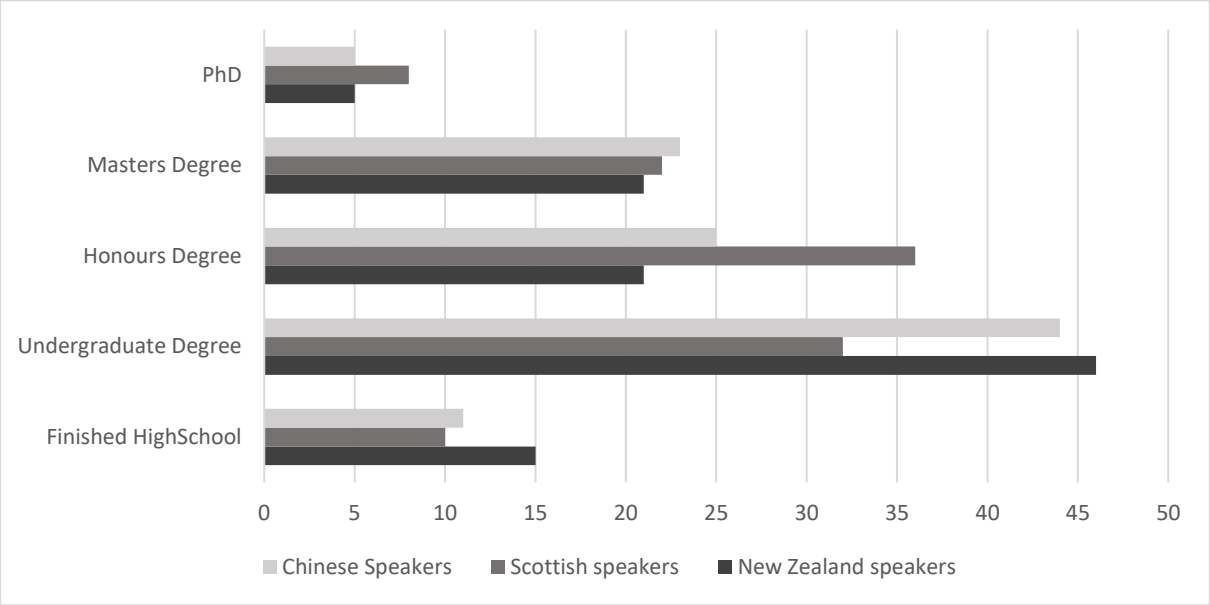
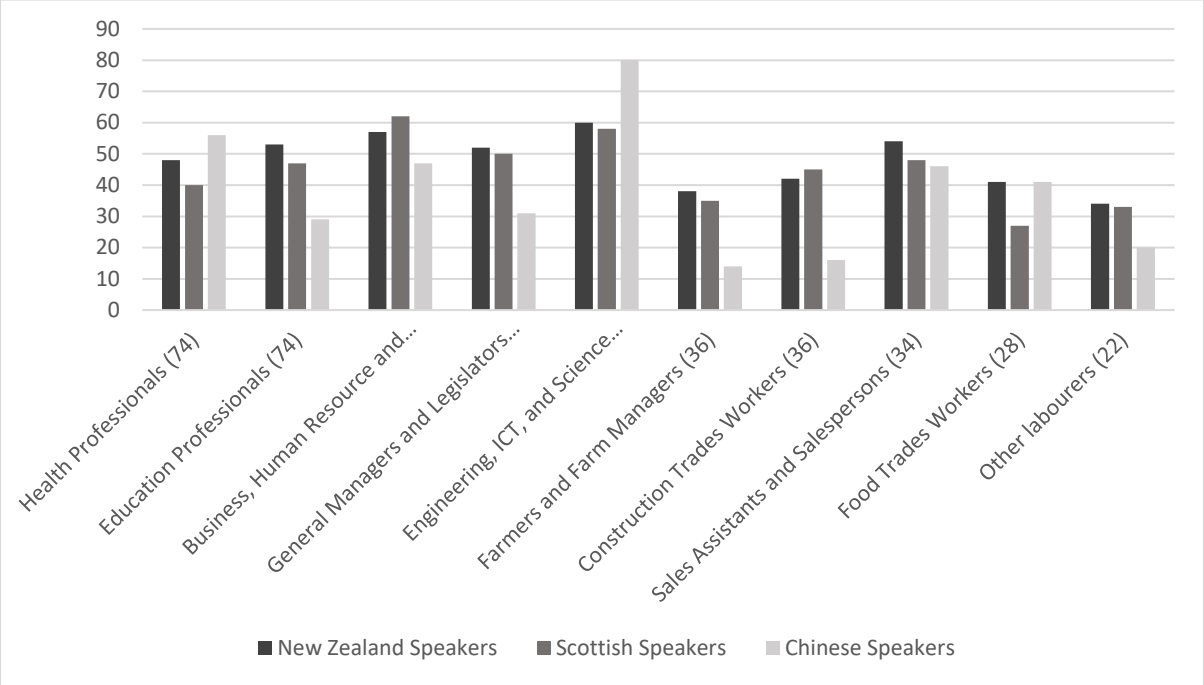


Figure 10 displays participants answers to the question "In your experience, what types of jobs do people who speak like this do?". The jobs are ordered based on their socio-economic index (Fahy, Lee, & Milne, 2017) with Health Professionals and Education Professionals having the highest SEI score and Other labourers having a lower SEI score. There are some trends which can be seen in this figure, such as Chinese being less associated with the jobs Education Professionals, General Managers and Legislators, Farmers and Farm Managers, and Construction Trades Workers, while the New Zealand and Scottish accents are associated similarly across almost all jobs. However, in order to properly investigate the associated jobs, we should examine by degree of accent.

Figure 10 – Associated jobs as grouped by accent



4.1.1 Perceptions of the New Zealand accented speakers

Figure 11 displays the number of times that listeners correctly identified each New Zealand speaker as being from New Zealand, the number of times they were misidentified as being from Australia, and the number of times they were misidentified as being from somewhere else.

Figure 11 – Number of times listeners correctly identified each New Zealand speakers

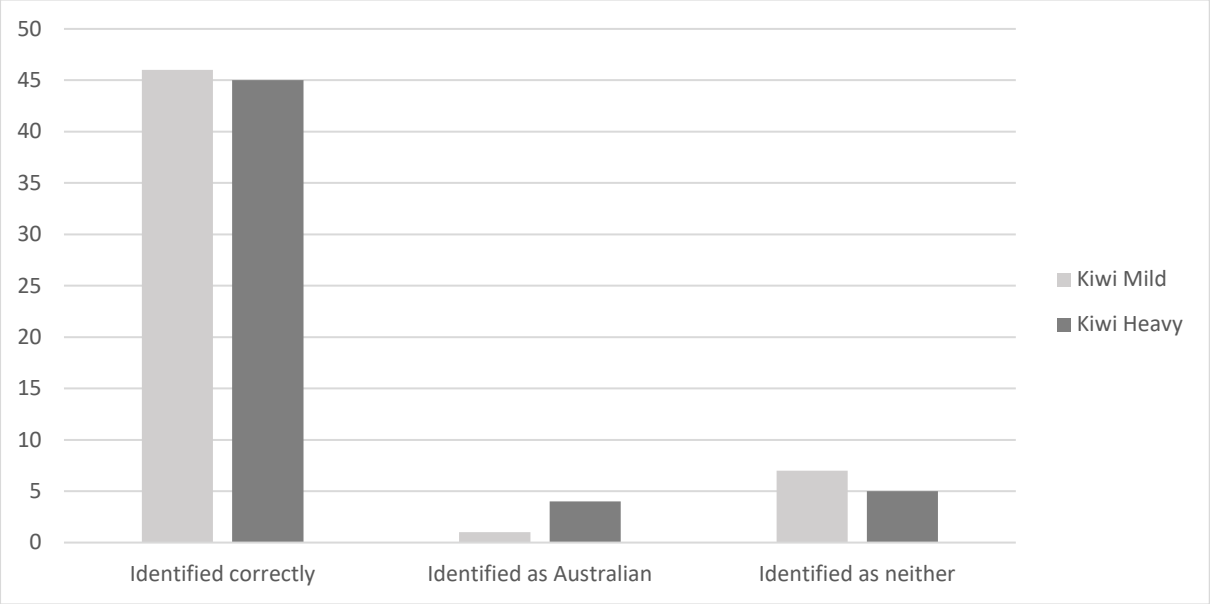


Figure 12 displays the jobs that listeners associated to the mildly accented New Zealand speaker compared with the heavily accented New Zealand speaker. The jobs are listed by their SEI score, with the highest being health professionals and education professionals, and the lowest being other labourers.

Figure 12 – Associated jobs for each of the New Zealand speakers

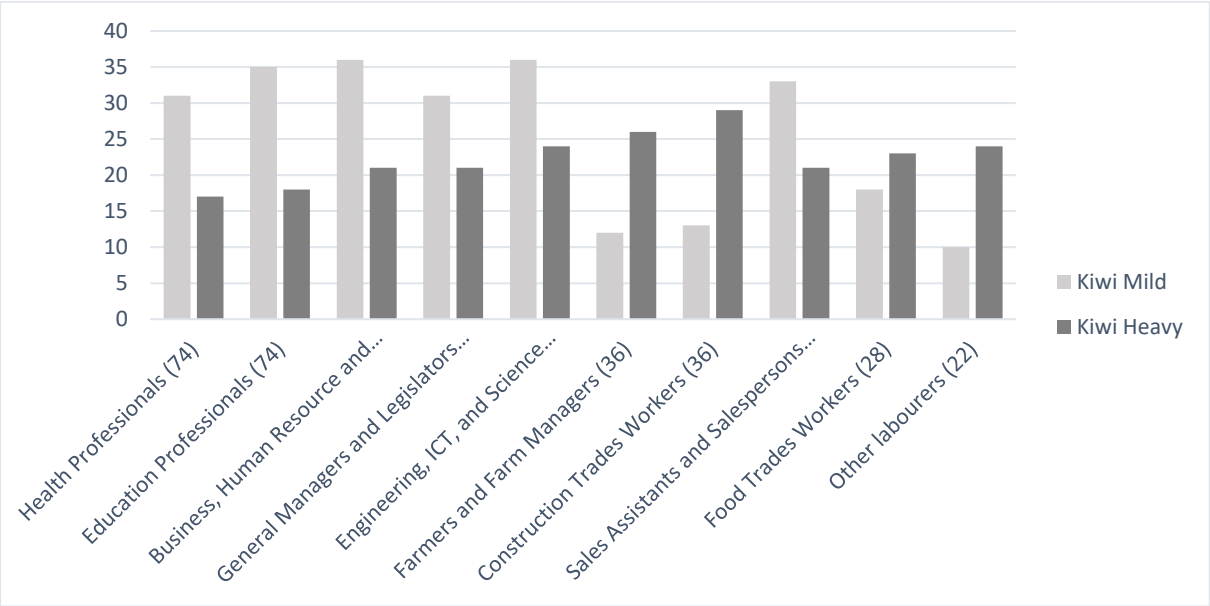
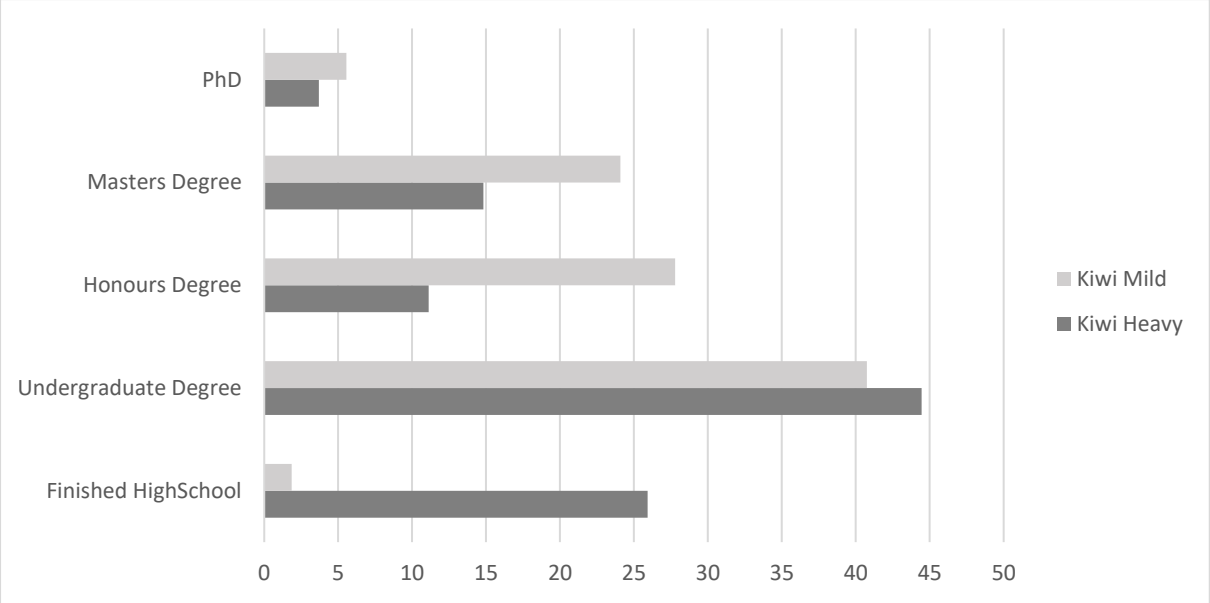


Figure 13 displays the listeners' perceived level of education for the mildly accented New Zealand speaker compared with the heavily accented New Zealand speaker. The mildly accented New Zealand speaker is overall rated to have a higher level of education.

Figure 13 – Rated level of education for the New Zealand speakers



4.1.2 Perceptions of the Chinese accented speakers

Figure 14 displays the number of times that listeners correctly identified each Chinese speaker as being from China, the number of times they were misidentified as being from Asia, and the number of times they were misidentified as being from somewhere else.

Figure 14- Number of times listeners correctly identified each Chinese speaker

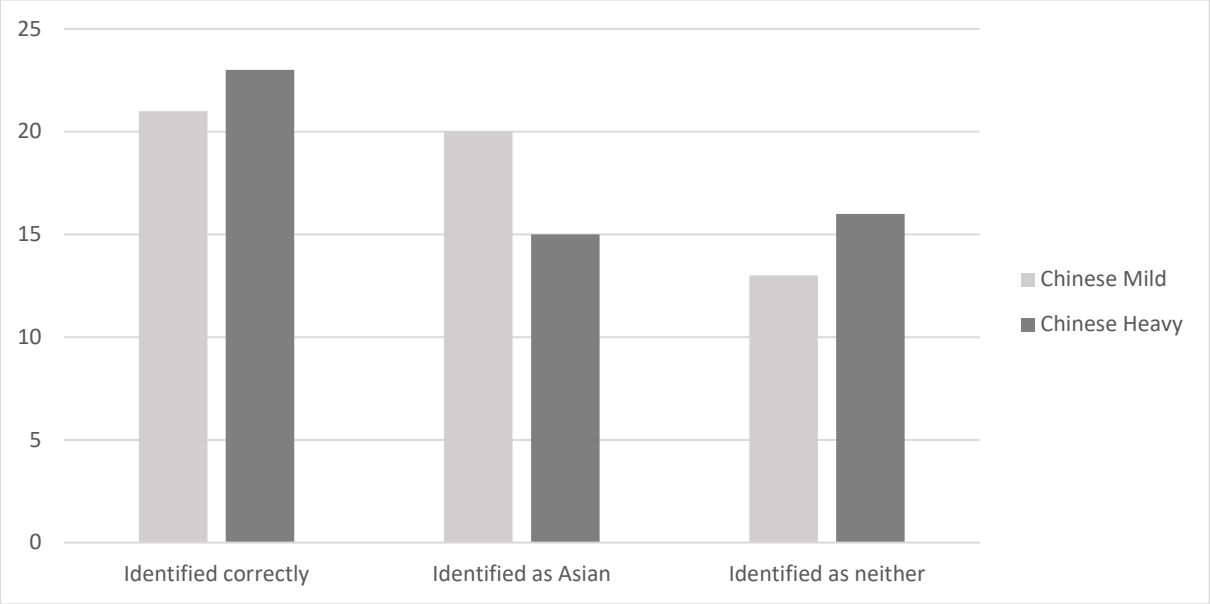


Figure 15 displays the jobs that listeners associated to the mildly accented Chinese speaker compared with the heavily accented Chinese speaker. The jobs are listed by their SEI score, with the highest being health professionals and education professionals, and the lowest being other labourers.

Figure 15 - Associated jobs for each of the Chinese speakers

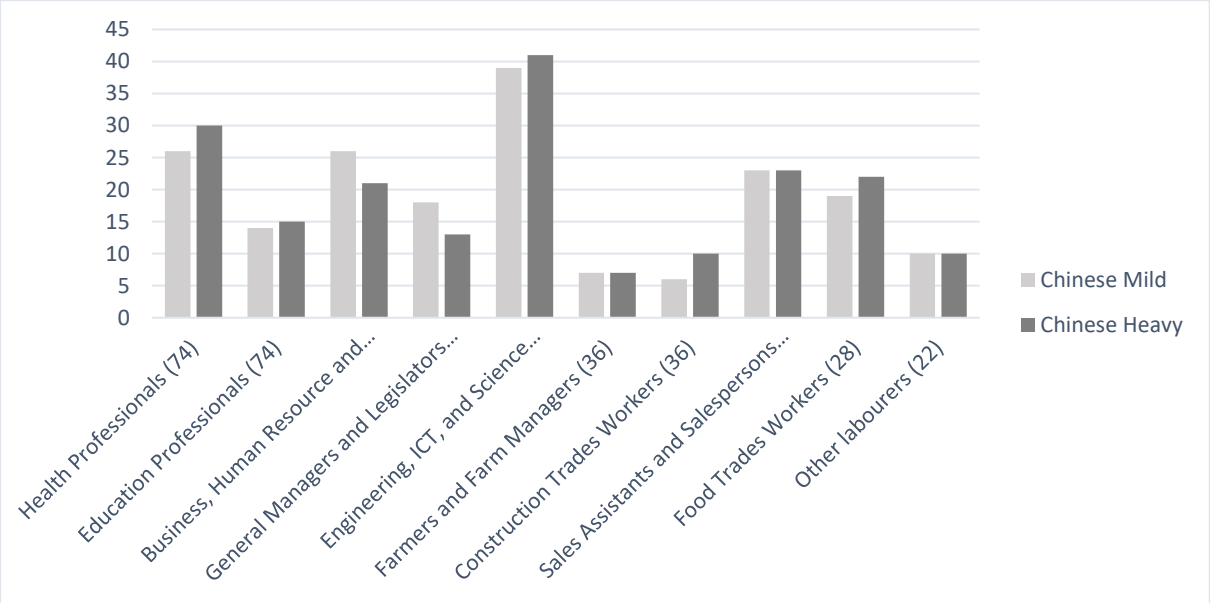
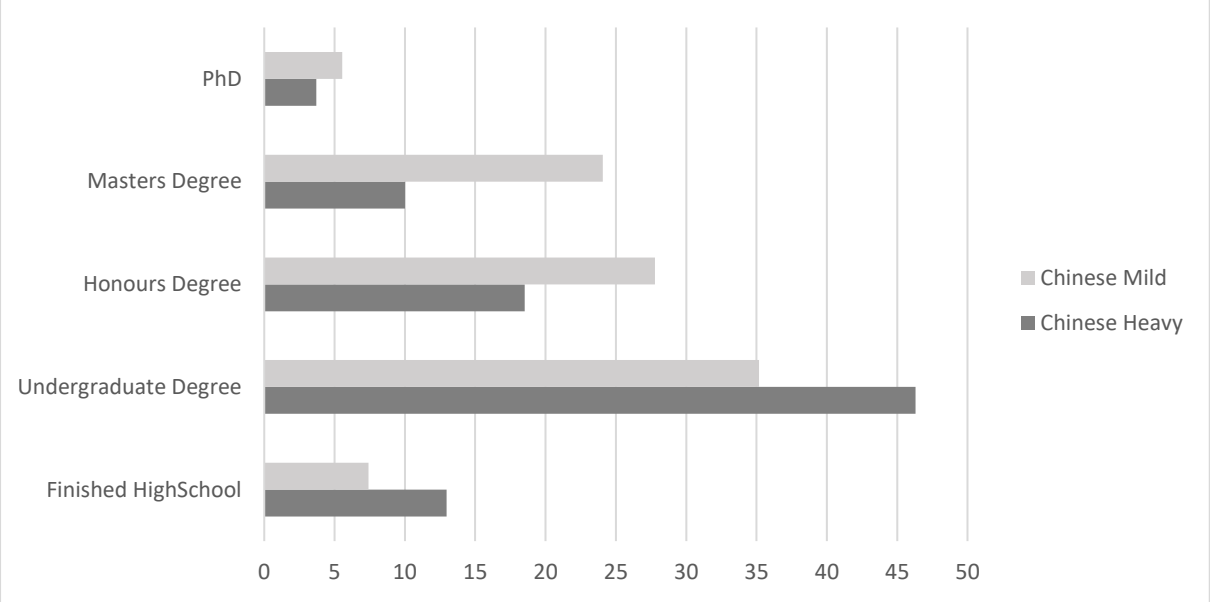


Figure 16 displays the listeners' perceived level of education for the mildly accented Chinese speaker compared with the heavily accented Chinese speaker. The mildly accented Chinese speaker is overall perceived to have a higher level of education.

Figure 16 - Rated level of education for the Chinese speakers



4.1.3 Perceptions of the Scottish accented speakers

Figure 17 displays the number of times that listeners correctly identified each Scottish speaker as being from Scotland, the number of times they were misidentified as being from Ireland, and the number of times they were misidentified as being from somewhere else.

Figure 17 – Number of times each listener correctly identified each Scottish speaker

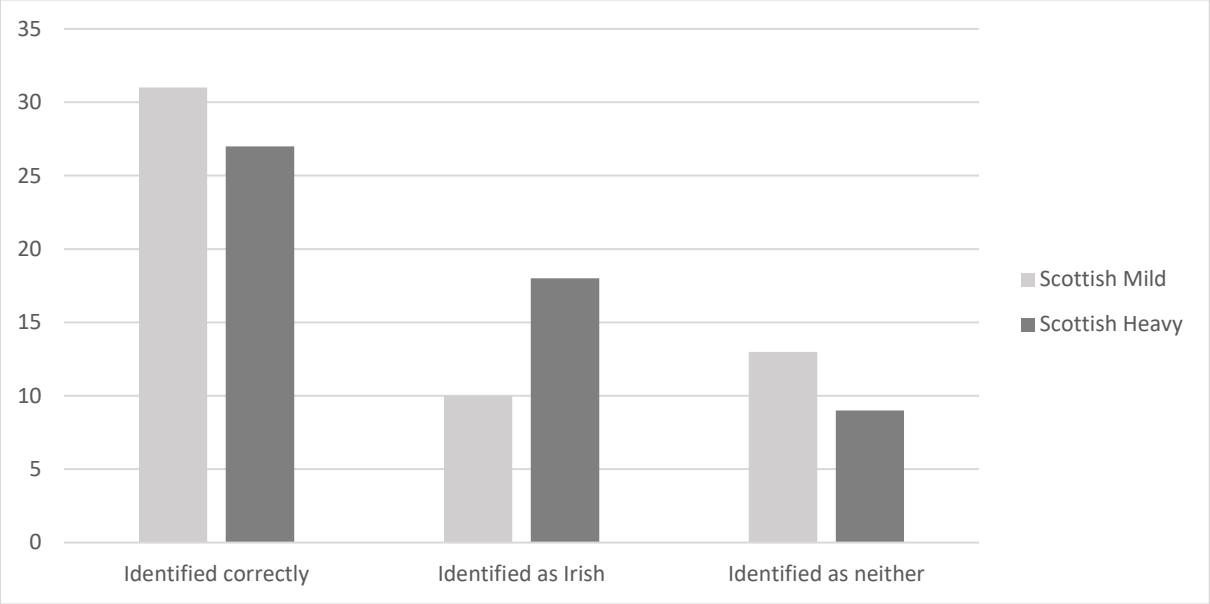


Figure 18 displays the jobs that listeners associated to the mildly accented Scottish speaker compared with the heavily accented Scottish speaker. The jobs are listed by their SEI score, with the highest being health professionals and education professionals, and the lowest being other labourers.

Figure 18 - Associated jobs for each of the Scottish speakers

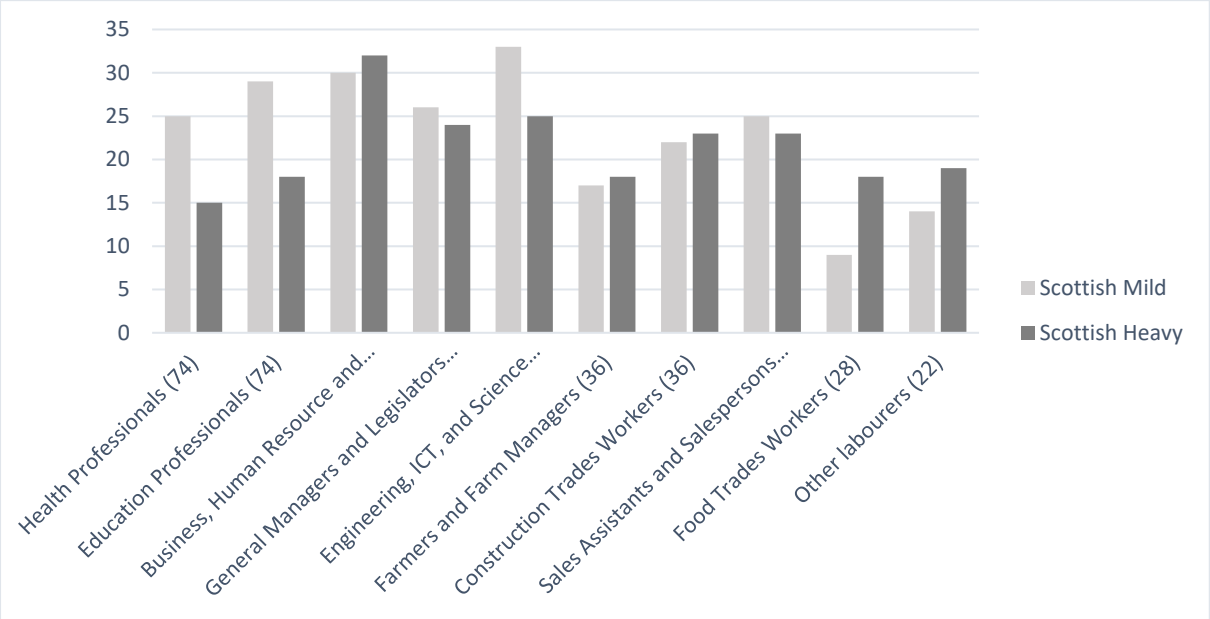
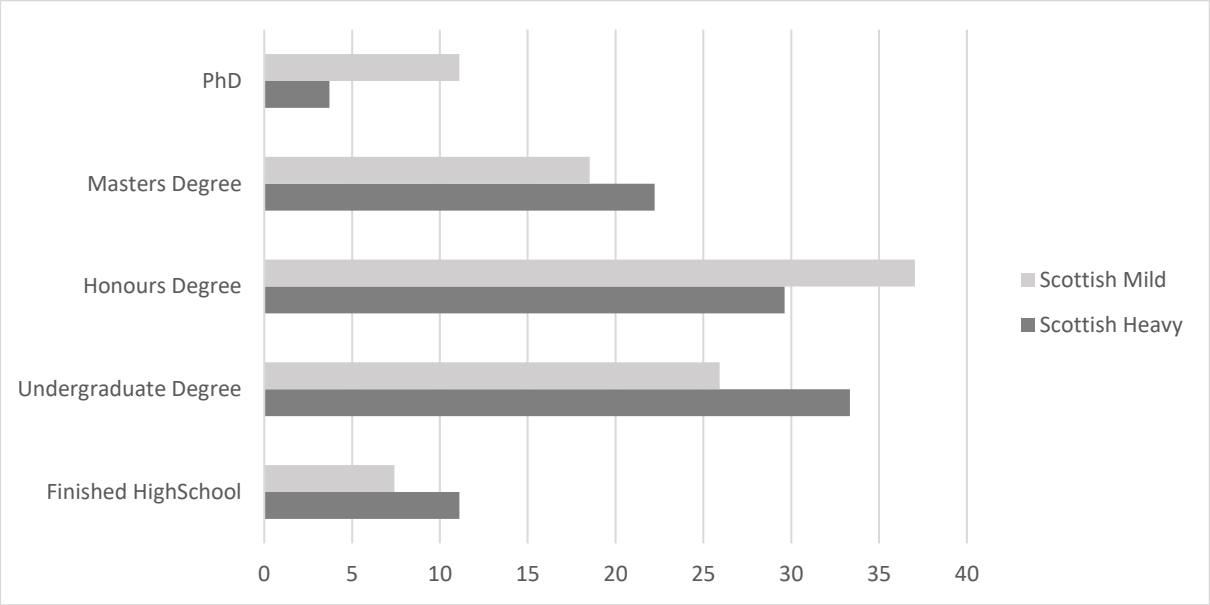


Figure 19 displays the listeners' perceived level of education for the mildly accented Scottish speaker compared with the heavily accented Scottish speaker. There is a much less clear split between the rated level of education of the mildly accented Scottish speaker and the heavily accented Scottish speaker.

Figure 19 - Rated level of education for the Scottish speakers



4.2 Analysis of the ratings of truthfulness

All participants of the perceptual task listened to the same 88 trivia statements. Each statement was always heard by each participant as read by the same speaker. The results presented in this section are based on the scores recorded by the respondents from the perceptual task. As a reminder, the truthfulness ratings were out of 100, with 100 being definitely true and 0 being definitely false.

The set of six obvious statements which were included among the trivia statements (one per speaker) were perhaps not as obvious as intended. The statement, "Wasps work for hours to make honey" was only rated to be 'Definitely false' by 54% of the participants. The most successful 'obvious statement' was "Wellington is the capital of New Zealand", which was rated as 'Definitely true' by 100% of the participants. Because of the success of this particular statement, all the participant ratings were included in the data and none were excluded, despite

some of these statements being answered incorrectly. The incorrect answers for the other "obvious statements" could be explained by some participants potentially being uncertain and preferring not to rate a statement as a definite. Therefore, all 54 responses are included within these results.

The analysis in this section was conducted in R (R Core Team, 2017). A linear mixed-effects model was fit to the data to assess the influence of various factors on credibility scores. This was done using the *lme4* package (Bates, D., Maechler, M., Bolker, B., Walker, S., 2015).

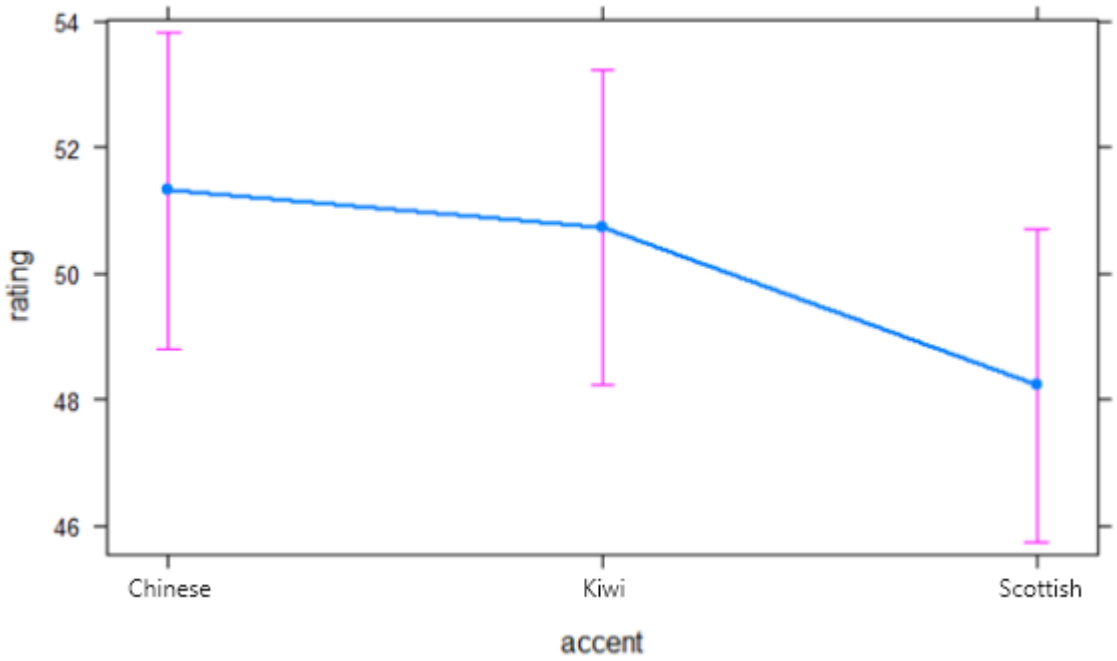
The effect of accent on the ratings of truthfulness was briefly examined as this was the main effect which was considered by all previous studies. This was done using a simple model which only included 'accent' as a fixed effect and 'participant' as a random effect. Table 2 shows that the Scottish accented speakers were perceived as significantly less credible than the Chinese accented speakers. The New Zealand accented speakers were not rated significantly differently to the Chinese accented speakers.

Table 2 – Summary of model including 'accent' as a fixed effect

```
Fixed effects:
            Estimate Std. Error       df t value Pr(>|t|)
(Intercept)   51.309      1.276   94.000  40.198  < 2e-16 ***
accentK       -0.585      1.097 4371.000  -0.533  0.59399
accentS       -3.083      1.087 4371.000  -2.836  0.00459 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

These effects are visualised in Figure 20, which shows that the Chinese speakers were perceived as the most credible and the Scottish speakers were perceived as the least credible. It should be remembered that these results have grouped the two speakers of each accent together.

Figure 20 – The effect of accent on ratings of credibility



Numerous factors of potential influence were included in a model to determine what best predicted the ratings of truthfulness. Because the current study is interested in the effects of the degree of accent, the accent weight (heavy vs mild) was included in the model. In order to test whether processing difficulty had an effect on ratings of credibility, I included ratings of difficulty in understanding and ratings of accentedness into the model. To examine the effect that stereotypes may have on ratings of credibility, I also included ratings of education in the model. The factors 'listener gender', 'listener native/non-native status', 'rated familiarity with each accent', and 'listener lived outside of New Zealand for longer than 6 months' were included in the model to examine the effects of listener background.

I used ANOVA to compare the effects of these various factors and took the model with the lower AIC score in order to reach the best model. Neither the difficulty in understanding, ratings of accentedness, ratings of education, rated familiarity with each accent, or whether the listener had lived outside of New Zealand for longer than 6 months had any significant effect on the ratings of truthfulness. Therefore, these factors were removed from the model.

Consequently, the fixed effects included in the final model were accent (New Zealand, Chinese, Scottish) interacted with accent weight (heavy vs. mild), and respondent gender, as

well as respondent native/non-native status. Respondent was also incorporated in the model as a random effect to control for the individual differences in sensitivity of listeners.

Table 3 summarises the model used in this study. Three plots are displayed below to visualise the data from this table.

Table 3 – Summary of main model

```
Fixed effects:
                      Estimate Std. Error         df t value Pr(>|t|)
(Intercept)            57.2409     3.2109   63.0000  17.827  < 2e-16 ***
accentK                -5.3554     1.5732 4368.0000  -3.404  0.00067 ***
accentS                -0.1358     1.5443 4368.0000  -0.088  0.92991
weightM                -1.7853     1.5443 4368.0000  -1.156  0.24771
Listener_nativeYes     -7.9302     3.0278   51.0000  -2.619  0.01158 *
Listener_genderMale     4.2669     2.0468   51.0000   2.085  0.04212 *
accentK:weightM         9.1940     2.1844 4368.0000   4.209 2.62e-05 ***
accentS:weightM        -5.9607     2.1636 4368.0000  -2.755  0.00589 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Figure 21 displays the listener ratings of credibility for all six speakers – Chinese Heavy, Chinese Mild, Kiwi Heavy, Kiwi Mild, Scottish Heavy, Scottish Mild. There is a significant difference between the ratings of the two New Zealand speakers and between the two Scottish speakers, but no significant difference between the ratings of the two Chinese speakers. The New Zealand mild speaker and the Scottish heavy speaker were both rated as more credible than the New Zealand heavy speaker and the Scottish mild speaker.

Figure 21 – The effect of accent and degree of accent on ratings of credibility

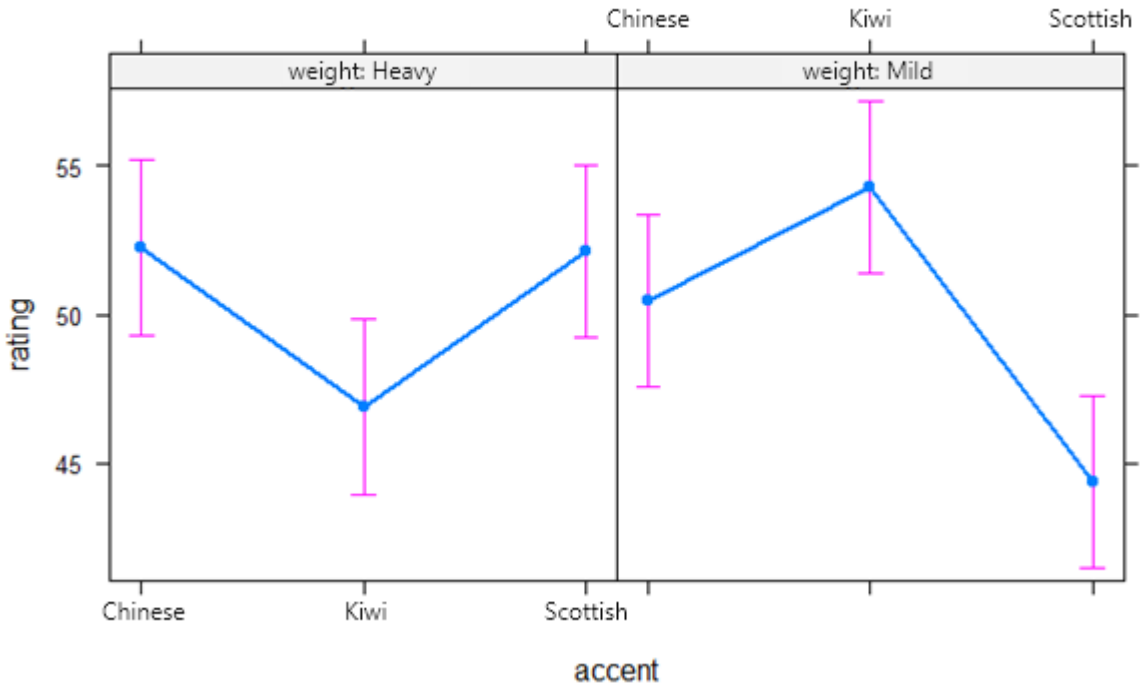
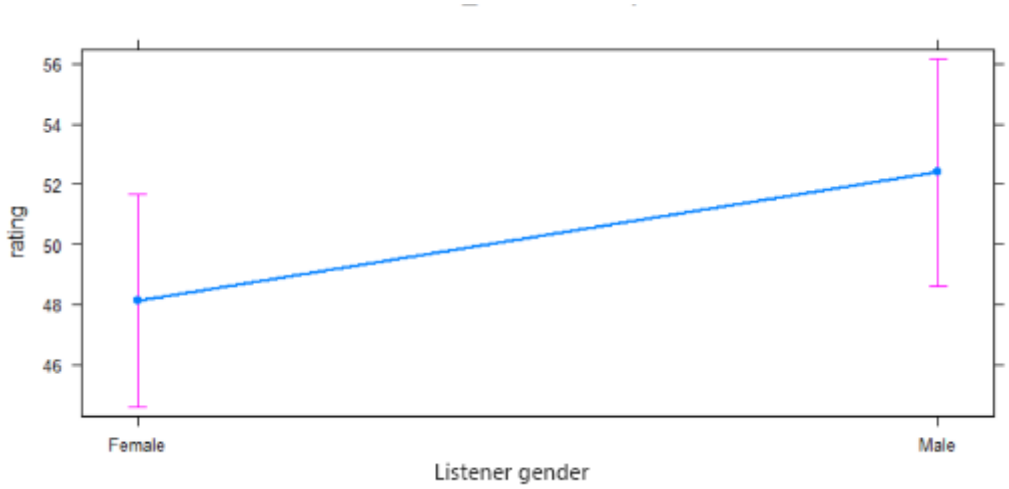


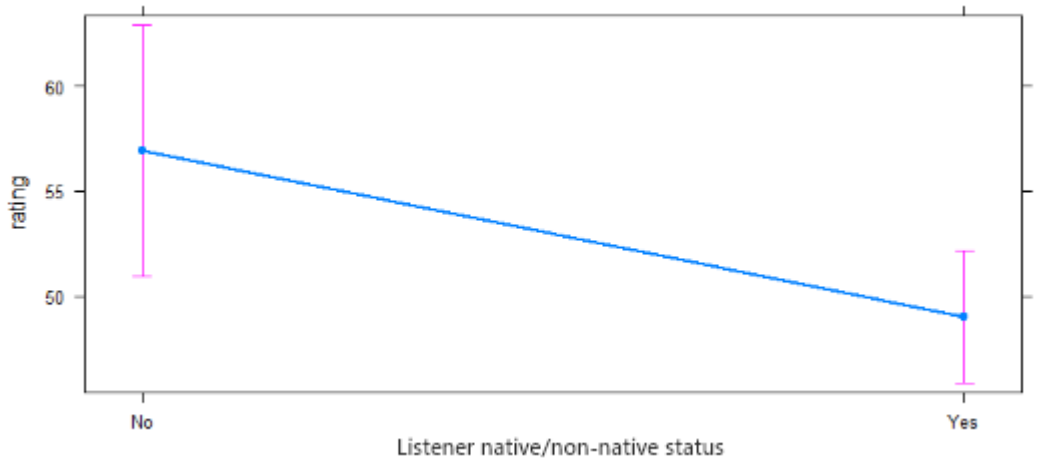
Figure 22 displays the influence of respondent gender on ratings of credibility. Male respondents rated speakers as more credible overall than female respondents.

Figure 22 – The effect of listener gender on ratings of credibility.



Next, we can examine the influence of respondent native vs non-native status. Although the number of non-native respondents were very low (7 out of 54), a significant effect was still found. Figure 23 displays the influence of respondent native/non-native status on ratings of credibility and shows that non-native English-speaking respondents rated the statements as more truthful overall.

Figure 23 – The effect of listener native/non-native status on ratings of credibility.



Chapter 5

Discussion

The purpose of this study was to see if the results of Lev-Ari and Keysar, (2010) and Hanzlíková and Skarnitzl (2017), could be replicated so that native accented speech was perceived to be more credible than non-native accented speech. However, it is noted that only Lev-Ari and Keysar (2010) claim that their findings are a result of difficulty in processing fluency, rather than resulting from any associated stereotypes. Neither the results of De Meo, et al., (2011), Souza and Markman (2013), or Stocker (2016) found any significant effect when comparing the perceived credibility of native vs non-native accents.

When considering the overall ratings of credibility, the current study seems to support the results of Lev-Ari and Keysar (2010), as well as Hanzlíková and Skarnitzl (2017), that native speakers are perceived as more credible than non-native speakers. The mildly accented New Zealand speaker was rated as the most credible. However, the mildly accented Scottish speaker, who is also a native speaker of English, was unexpectedly rated as the least credible. The rest of the speakers (Kiwi Heavy, Scottish Heavy, Chinese Mild and Chinese Heavy) are all somewhere in the middle, with no significant difference between them.

This provides answers for both research questions 1 and 1a together. The results of this study show that, for New Zealand speakers, as well as the Scottish speakers, perceptions of credibility are highly dependent on the degree of accent. Mild New Zealand accents are perceived as more credible than heavy ones, while heavy Scottish accents are perceived as being more credible than mild ones. However, for Chinese speakers, the degree of accent has no effect. There are many potential factors which could have caused the mildly accented New Zealand speaker to be perceived the most positively, while other accents were rated as less credible to varying degrees. Some of these factors were tested for in the current study and are discussed briefly in this section.

The two aspects of listener background, ‘gender’ and ‘native/non-native status’, (even though the number of non-native participants was low) had significant effects when included in the statistical model. Male listeners were more likely to believe the speakers and rated them as more credible overall. Non-native listeners were also more likely to rate speakers as more

credible. This study has once again highlighted the importance of listener background when researching listeners' perceptions, which was also emphasized in Stocker (2016). Many factors, including a person's linguistic, cultural and biological context, should be considered, as all of these could potentially have an effect on perceptions. The results of this study suggest that native listeners and females are less likely to believe someone else.

Multiple studies (Pearson, 1982; Weibel, Wissmath, & Groner, 2008; Brann & Himes, 2010; Boyle, 2014) have researched the effects of speaker gender on listeners' perceptions of credibility. However, there seems to be a lack of research on how listener gender affects perceptions of credibility. The current study's results suggest that male listeners are more likely to believe a speaker than female listeners.

Hanzlíková and Skarnitzl (2017) found that non-native listeners rated native speakers as more credible than non-native speakers. The results of the current study, while only supported by a small number of participants, potentially extend our understanding of non-native listeners perceptions of credibility. Non-native listeners rated speakers as more credible overall when compared with the ratings of native listeners.

5.1 The effects of accentedness and difficulty in understanding

Credibility ratings of the empirical study were not found to be affected by ratings of difficulty in understanding or ratings of accentedness when included in the statistical model. Therefore, to answer question 2, the current study cannot provide any evidence to support or oppose the theory that processing difficulties affect perceptions of credibility. However, the majority of the studies that considered the effects of listener difficulty in understanding and level of accentedness did not obtain these ratings from the respondents themselves, but instead from a separate group of participants. The current study improved on this methodology and gathered these ratings directly from the same participants who completed the perceptual task.

Although factors such as ratings of accentedness and difficulty in understanding did not produce any significant effect when included in the model, considering these ratings can still be useful. Any suppositions made from these ratings may not have any strong significance, but the method is still an improvement on that of Lev-Ari and Keysar (2010), and of De Meo et al. (2011), and Souza and Markman (2013). Unlike this study, these studies all drew conclusions about the potential relationship between difficulty in understanding and respondent ratings of

credibility using some form of external group of participants. Because a separate group of participants were used for gathering these ratings, it was not possible for these studies to include them in any statistical model.

When considering the general ratings provided by respondents as to the level of accentedness and difficulty in understanding of each speaker, we find an expected result. Just as was found by Souza and Markman (2013), the pattern showed that the more accented the speaker, the more difficult the speaker was to understand. Within each speaker group, the heavily accented speaker was always perceived as more accented than the mild one. Chinese speakers were perceived as most accented, then Scottish speakers, and finally the New Zealand speakers. However, even when considering these overall ratings of accentedness and difficulty, it seems unlikely that processing difficulty had any effect on ratings of credibility. If processing difficulty had had an effect, then we would expect that, the more difficult to understand a speaker was rated to be, the less credible the speaker would be perceived to be. This is not the pattern which was found when considering the individual ratings of credibility for each of the six speakers, which can be seen in Figure 21. In this study, we see that the mild New Zealand speaker was rated as the least difficult to understand, and the mild Scottish speaker was perceived as the third least difficult to understand. However, despite these ratings, the mild New Zealand speaker was perceived as the most credible, and the mild Scottish speaker was perceived as the least credible.

If we were to draw any conclusions based on the ratings discussed above, they certainly would not support the idea presented by Lev-Ari and Keysar (2010) that processing difficulty affects perceived credibility. If this were the case, we would expect that speakers rated as more difficult to understand (i.e. the heavily accented speakers) would be rated as less credible than the mild speakers. However, the results found by the current study do not show this trend among the two Chinese speakers, or the two Scottish speakers.

The Chinese speakers do not differ significantly in perceptions of credibility between them. This was very unexpected, as the heavily accented speaker seemed obviously more accented and more difficult to understand by both the researcher and the participants who took part in the external test for speaker comparison. The lack of difference of perceived credibility between these two speakers may be better explained by pre-existing views rather than the cognitive effort among listeners. In the case of the Scottish speakers, the mildly accented speaker was perceived as less credible than the heavily accented one, which is the opposite to

the expected behaviour if processing difficulty was involved. The New Zealand speakers do display this distinction where the mildly accented speaker is perceived as significantly more credible than the heavily accented speaker. However, there may be better explanations for this which are discussed later.

Therefore, if processing difficulty does not have an effect on perceptions of credibility, as has been argued by De Meo et al. (2011), Souza and Markman (2013), Stocker (2016) and now the current study, then the results of Lev-Ari and Keysar's (2010) second study may be interpreted to have very interesting results. In this second study, they explicitly told participants that the aim of their study was to discover whether the difficulty of understanding speakers' speech affected the believability of the statements (Lev-Ari & Keysar, 2010). Results of this second study still showed that the heavily accented non-native English speakers were overall perceived as less credible, despite being told the aim of the study. If participants were aware that they were being tested to see if they would rate certain speakers as less credible simply based on the way they spoke, then it is possible that attitudes towards accented speech may lie outside of listeners' conscious control.

5.2 The effects of associated stereotypes

Since difficulty in processing fluency did not provide any compelling evidence for the effect on ratings of credibility, we may turn to the effects of stereotypes, which in turn helps to answer the third research question which the current study set out to answer. This question asks how associated stereotypes interact with perceptions of credibility.

Including 'rated level of education' in the statistical model did not produce any significant statistical effect. However, we can still discuss other aspects of the overall ratings and how stereotypes may be playing a role on listener perceptions of credibility. It is useful to first summarize the listeners' perceptions of each of the six speakers, so we can understand the listeners as a group. None of the previous studies have included stereotypes as a potential influence. The current study gathered attitudinal information from listener participants for two aspects of the speakers -*level of education* and *associated job type*. The responses for these two aspects are also briefly discussed in this section.

When considering the perceptions of the six speakers, differences are more apparent when focusing on the degree of accent within each accent group. Overall, the New Zealand

speakers were rated as the least accented and the least difficult to understand. This is expected as the experiment was run in New Zealand with largely New Zealand English speaking listeners. The heavily accented New Zealand speaker was rated to be slightly more accented and slightly more difficult to understand than the mildly accented speaker. Although both speakers were identified correctly as being from New Zealand the majority of the time, perceptions of both education and job type differ greatly. There is a clear divide between the associated jobs. Occupations which do not require a university degree and have a low SEI score were associated with the heavily accented speaker, and those that require a university degree and had a high SEI score were associated with the mildly accented speaker. The only exception to this clear split was "Sales Assistants and Salespersons", where the mildly accented speaker was rated higher. This can be explained by the large number of part time workers in this occupation, many of whom are students. When it comes to education, once again, the mildly accented speaker was perceived to be more educated. Overall, listeners had much more positive stereotypes towards the mildly accented New Zealand speaker compared to the heavily accented New Zealand speaker.

The Chinese accented speakers were rated to be the most heavily accented and the most difficult to understand. Across the three accents, the Chinese accent was most often misidentified for both the mild and heavy speakers. The heavily accented speaker was rated as more accented and more difficult to understand than the mildly accented speaker. The mild Chinese speaker was rated to be overall more educated than the heavy speaker. However, although listeners believed the mild speaker to be more educated, this had no impact on the associated jobs, which showed no significant difference and were roughly the same for each speaker. The difference in perceived level of education could be explained by the fact that people generally assume that a more fluent speaker has studied English for a longer time and thus is more educated.

The Scottish accented speakers were perceived to be not as accented or difficult to understand as the Chinese speakers, but more than the New Zealand speakers. They were correctly identified most of the time, with Irish being the second guess for listeners, especially for the heavily accented speaker. In terms of education, the mild speaker was as rated slightly more educated overall. However, this is not significant. The associated jobs were also not meaningfully different, except for the mild speaker more often being associated as "Health professionals" and "Education Professionals" while the heavy speaker was more often associated with "Food Trades Workers" and "Other labourers".

The listener group were obviously more sensitive to information that they are familiar with. Both the Chinese speakers and the Scottish speakers were often misidentified, and listeners overall reported a much lower level of familiarity with these two accents compared with the New Zealand accent. Although listeners recognised the difference in degree of accent for the speakers of each accent, with regard to ratings of education and jobs, the clearest results are seen within the New Zealand speakers, whose accents were undoubtedly most familiar to the listeners.

I suggest that, because listeners were more familiar with the New Zealand accent, pre-existing stereotypes were more accessible than for accents that were less familiar. Listeners may not have had any particular stereotypes which distinguish between heavily accented Chinese and Scottish and mild ones, thus there was no possible prejudice to be displayed by the listener participants. For the Chinese speakers in particular, because ratings of credibility between them were so minimal, it seems likely that listeners were drawing on one particular stereotypes for both speakers. Therefore, no effect occurred when one was more accented or more difficult to understand than the other.

One potential reason for the low rating of the mildly accented Scottish speaker is that he may have had weaker associations in listeners minds to 'Scottish-ness' and more strong ties to regional New Zealand, while the heavily accented Scottish speaker's accent may have had more positive effects because he simply sounded more foreign to the listeners.

One potential possibility to be aware of is that the questions targeting stereotypes in this study (level of education and associated jobs) were not linked to credibility strongly enough. Therefore, listeners may have rated a speaker as being less educated and more likely to have a job with a lower SEI score, but still perceived the speaker as highly credible. The methodology used by Stocker (2016), who asked participants to match certain languages with a selected number of adjectives, some of which referred to the sematic field of "credibility", may be a better approach for future studies.

One of the most interesting results of this study is the clear distinction listeners were able to make between a mild New Zealand accent and a heavy one. This may relate to the results of Dixon et al. (2002), who found that particular regional accents in the UK may result in significantly more negative perceptions among others. In the case of their study, the regional accent was rated 'guiltier' than a standard RP accent. It is not widely acknowledged or even realised by most New Zealand people that there is any difference between the way that urban

New Zealanders speak and the way that rural New Zealanders speak. However, this is the distinction which was made in this study between the two New Zealand speakers. Listeners clearly favoured the mild accent with regard to job types and education ratings. Listeners were also able to identify a difference between the two by rating the heavy New Zealand speaker as more accented and more difficult to understand overall. The ratings of credibility were also most significantly different between these two speakers compared with the other two accent groups. These results show that listeners are able to distinguish between urban and rural New Zealand accents, and this distinction can cause differences in listeners' perceptions.

5.3 Trivia statement truthfulness ratings

As has been previously stated, 45 of the trivia statements used in this study were taken from the original set of trivia statements used in the study performed by Lev-Ari and Keysar (2010). These statements were also used by Stocker (2016) and Hanzlíková and Skarnitzl (2017) in their experiments respectively. Lev-Ari and Keysar (2010) state that half the statements in their experiment were true (p.1094). However, as noted above, the actual truthfulness of the trivia statements used is irrelevant, as each of these experiments have tested listener perceptions. More important that the *actual* truthfulness of the statements is the *perceived* truthfulness. This was tested in the pilot study which I conducted prior to conducting the main perception experiment, and this helped to determine the statements I used in the listening task, as well as which of the statements would be read by each speaker.

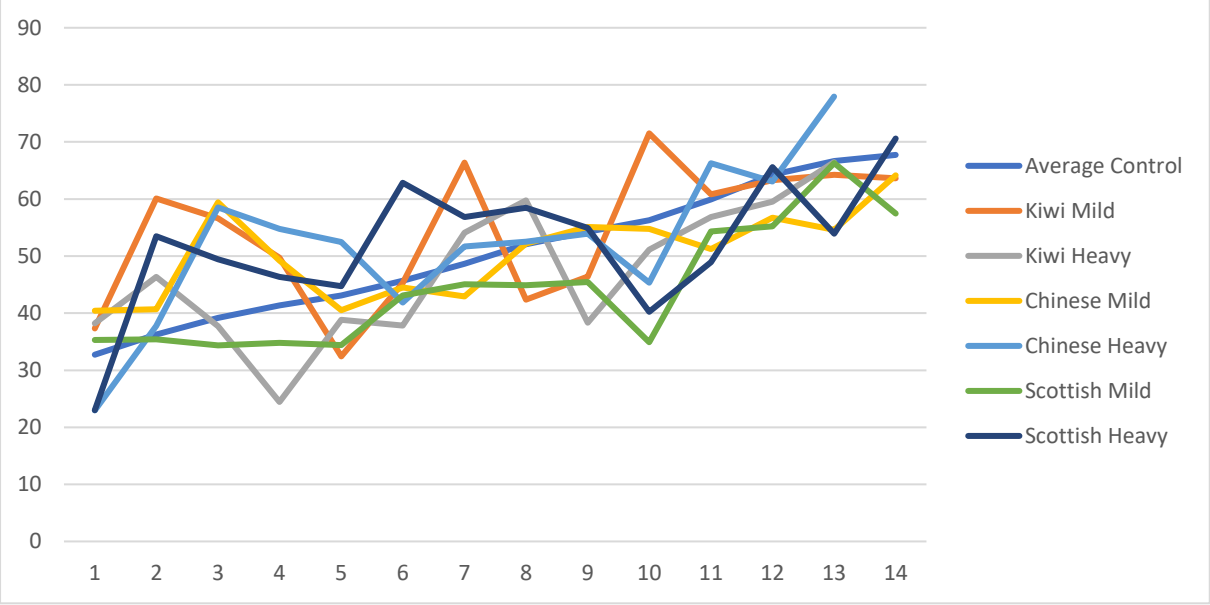
There were 34 responses collected in the original results of the pilot study. These results were analysed and have been discussed in the methodology of this paper. However, after analysing the result from these participants, the online survey continued to run and collect more responses. An additional 37 responses were collected, making a total of 71 responses collected from the pilot study survey. Some of these responses were not fully completed. In these cases, the available data was still used.

These results allow for additional analysis into the perceived truthfulness ratings of each statement. A comparison can be made between the truthfulness ratings by participants of the pilot study who read the trivia statements and participants of the perceptual experiment who heard the statements read in different accents.

A closer examination of the 45 statements used by Lev-Ari and Keysar (2010), and therefore by Stocker (2016) and Hanzlíková and Skarnitzl (2017), reveals that a total of 10 of these statements were rated to have a perceived truthfulness rating of either below 1.5 or above 3.5 (from a 0-5 *Likert* scale). However, according to the described methodology of the current study, these statements would have been excluded from the trivia statement set.

Similarly to De Meo, Vitale, Pettorino and Martin (2011), we can examine the average rated truthfulness for each individual trivia statement using percentage values. However, the current study can take this one step further and compare these ratings with the average rating of perceived truthfulness from the pilot study. This was done by organising each of the statement groups spoken by each speaker to be in ascending order. This order was based on the original ratings of truthfulness from the pilot study which helped to divide the groups between the speakers. By dividing the statements between speakers in this way, it ensured that each speaker had a similar distribution of statements and their respective truthfulness ratings.

Figure 24 - Average statements ratings of truthfulness for the perceptual task ratings compared with pilot study ratings



From Figure 24, we can see that the statements spoken by the mildly accented Scottish speaker were perceived to be less truthful than the average truthfulness rating collected from the pilot study for almost every statement. The statement ratings for other speakers were largely

varied, sometimes above the average truthfulness rating and sometimes below. This suggests that the mildly accented speaker truly was perceived by listeners to be less credible.

Chapter 7

Conclusions

This thesis aimed to investigate how accented speech affects perceptions of credibility in New Zealand, with a focus on the New Zealand, Chinese and Scottish accents. The degree of accent (heavy vs. mild) was also considered. This thesis expanded on previous research which had reported varying results regarding the effect of accents on perceptions of credibility as well as the reasons for this effect. Results showed that an urban New Zealand accent was rated as being significantly more credible than a rural New Zealand accent. No difference was displayed between a heavily accented Chinese speaker and a mildly accented Chinese speaker. A mildly accented Scottish speaker was rated as being significantly less credible than a heavily accented Scottish speaker. Results also showed that male listeners as well as non-native listeners were more likely to rate speakers as more credible. This study provides insight into the perceptions of credibility among New Zealand listeners as well as a small group of non-native listeners in the New Zealand context. No evidence was found to support the idea that processing difficulty has any effect on perceptions of credibility. It is suggested that associated stereotypes may better explain the differences of perceptions of credibility. However, these stereotypes may affect listeners differently depending on their familiarity with the accent. As the heavily accented New Zealand speaker was perceived as significantly less credible than the mildly accented New Zealand speaker, it is suggested that further research should examine other potential differences in perceptions between a rural accent and an urban accent in New Zealand.

7.1 Limitations and future directions

The number of participants in this study were comparable to many of the other studies which have been discussed throughout this thesis. However, because I looked at many aspects of potential influence, a greater number would have been beneficial. One thing that I did not do was include ‘statement’ as a random effect in the model. This was because each statement was only ever spoken in one accent which connects the statements and accent. A recommended methodology for a future study would be to also research multiple accents, but also expand the

listeners to include multiple groups. This study would have benefited from having a Scottish group of listeners and a Chinese group of listeners as well as the New Zealand group of listeners. This would provide a more insight into the perceptions of different listener groups towards the respective accents.

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Appendix A

The total list of trivia statements read by each speaker including statements that were later excluded.

1. The cigarette lighter was invented before matches.
2. The sound heard by a listener when holding a seashell to his ear is the echo of the blood pulsing in the listener's own ear.
3. Ants don't sleep.
4. Crocodiles can't stick out their tongues to prevent them from biting off their tongue.
5. A kangaroo can't jump unless its tail is touching the ground.
6. Polar bears can swim more than 60 miles without a rest.
7. Owls swallow their prey whole because they have no teeth.
8. The flea can jump 350 times its body length.
9. Tigers have striped skin not just striped fur.
10. An ostrich's eye is bigger than its brain.
11. Camels have three eyelids to protect themselves from blowing sand.
12. The planet Venus has no seasons because it does not tilt as it goes around the Sun.
13. A giraffe can go without water longer than a camel can.
14. A giraffe’s heart can pump 16 gallons of blood in one minute.
15. Even though a polar bears fur looks white it is actually colourless.
16. Polar bear fur is oily and water repellent.
17. The Sun contains 99.8 percent of the total mass of the solar system.
18. The Sun shrinks five feet every hour.
19. The only animals born with horns are giraffes.
20. An oyster can change its gender.
21. The two hemispheres of a dolphin's brain work independently in alternating "shifts" of 8 hours.
22. The Can opener wasn't invented until 48 years after the can.
23. A hippo can run faster than man.
24. A mosquito has 2 teeth.
25. The first public library in the world was in Vienna, Austria in 1745.
26. Earthworms have five brains.
27. Jerusalem, Israel is the oldest city in the world.
28. Sharks attack women ten times more often than they attack men.
29. The koala is the only known animal that never gets sick.
30. The only places on the body of a cow that have sweat glands are the ears.
31. Luxemburg is the European country with the highest population density.
32. Women blink nearly four times as much as men.
33. The planet Jupiter spins opposite to the other planets in the solar system.
34. The first city to establish a police force was Rome, Italy in 1667.
35. The leech has 32 hearts.
36. Ireland is the country with the highest number of breweries after the US.
37. 15 percent of the water covering the earth is drinkable.

38. Only young polar bears hibernate.
39. A snail can sleep for a decade.
40. There are approximately 20,000 feathers on an eagle.
41. Falcons are the only birds who can see the color blue.
42. When a polar bear cub is born it cannot see or hear for approximately a year.
43. The hides of mature male blue sharks are more than twice as thick as those of females.
44. Large crocodilians cannot survive for more than a few days without food
45. The first country to issue postage stamps was Germany.
46. Sharks have upper and lower eyelids but they do not blink.
47. Polar bears are predominately left handed.
48. The shortest war in history was between England and Zanzibar. Zanzibar surrendered after 38 minutes.
49. The elephant is the only mammal that can't jump.
50. Uncle Tom's Cabin, by Harriet Beecher Stowe was the first American novel to sell a million copies.
51. The original name for butterfly was flutterby.
52. Children grow twice as fast in the spring as they do in the fall, while they gain more weight in the fall.
53. The original purpose for what is now known as Play-Doh was a crack filler.
54. Versailles was an asylum prior to becoming a palace.
55. The first zoo in the United States was in Boston, Maine in 1876.
56. Camel milk is the quickest milk to curdle when boiled.
57. A snake is communicating when it sticks out its tongue.
58. The Sea of Tranquility on the moon is shallower than any lake on earth.
59. Some crocodiles may eat other crocodiles.
60. The carol “Jingle Bells” was actually written for Easter.
61. The average adult stands 0.4 inch (1 cm) taller in the morning than in the evening
62. The first train robbery in the United States took place in 1866.
63. Men get hiccups more often than women.
64. Ostriches stick their heads in the sand to look for water.
65. A pregnant goldfish is called a twit.
66. A flamingo can eat only when its head is upside down.
67. Peanuts are one of the ingredients in dynamite.
68. Ants stretch when they wake up in the morning.
69. Slugs have 4 noses.
70. The parachute was invented 120 years before the airplane.
71. The longest recorded flight of a chicken is thirteen seconds.
72. Snails can sleep for 3 years without eating.
73. If a frog's mouth is held open too long the frog will suffocate.
74. An office chair with wheels travels 8 miles a year.
75. An animal epidemic is called a epizootic.
76. A polar bear's skin is black. Its fur is not white, but actually clear.

77. Clinophobia is the fear of beds.
78. Porcupines float in water.
79. Only female mosquitoes will bite you.
80. Horses can't vomit.
81. Windmills always turn counter-clockwise, unless they're in Ireland.
82. A Jiffy is an actual unit of time. 1 Jiffy = 1/100 of a second
83. Thomas Edison, the inventor of the lightbulb, was actually afraid of the dark.
84. The letter Z is only used in words more than five letters when two vowels are present.
85. The ice cream cone was originally a way to hold flowers.
86. A cockroach can live for up to 3 weeks without its head.
87. Bubble wrap was originally intended to be used as 3D wallpaper
88. A goldfish can live up to 40 years.
89. A duck has three eyelids.
90. The average life of a taste bud in the mouth is 10 days.
91. 8% of human beings in the world have an extra rib.
92. Children grow faster in springtime compared to other seasons.
93. Your stomach produces a new layer of mucus every 2 weeks, or else it will digest itself.
94. One-fourth of the bones in the human body are located in the feet.
95. Most hamsters blink one eye at a time.
96. A duel between three people is called a truel.
97. The stage before frostbite is called frostnip.
98. There are no bridges over the amazon river.
99. The lung fish can live out of water for as long as four years.
100. A whale lives in the ocean.
101. Pigs can fly.
102. A rhino is the only animal to have three eyes.
103. Wellington is the capital of New Zealand.
104. Wasps work for hours to make honey.
105. The kiwi bird became extinct in 1845.

Appendix B

Example of the questions listeners answered about each speaker.

Where do you think this speaker is from?

[text field]

How educated do you think this speaker is?

Finished Highschool Undergraduate Degree Honours Degree Masters Degree Phd

In your experience, what types of jobs do people who speak like this do?

- General Managers and Legislators
- Construction Trades Workers
- Engineering, ICT, and Science Technicians
- Food Trades Workers
- Business, Human Resource and Marketing Professionals
- Sales Assistants and Salespersons
- Education Professionals
- Farmers and Farm Managers
- Health Professionals
- Other labourers

How accented do you find this speaker?

Scale from “not difficult to understand” to “very difficult to understand”.

Appendix C

Example of the questions listeners answered about themselves.

Do you identify as:

- Male
- Female
- Other

Are you a native speaker of English?

- Yes
- No

Tick any of the following ethnicities that you identify with:

- New Zealand European/Pākehā
- Māori
- Pacifica
- Indian
- Chinese
- Other Asian
- Other [please specify]

Please specify your age:

[text field]

Please list the languages you speak:

[text field]

Have you lived outside of New Zealand for a period of longer than six months?

- No
- Yes [please specify the countries you stayed in]

Approximately how regularly do you hear the following accents during your activities?

American

Australian

English (UK)

Scottish

New Zealand

Irish

Chinese

Indian

Arabic

Korean

For each accent, the listener provided a rating of frequency. Either “Never”, “A few times a year”, “A few times a month”, “A few times a week” or “Every day”.