SOCIOLINGUISTIC ELEMENTS OF ACCENT PERCEPTION IN AMERICAN AND IRISH

ENGLISH

By

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Abstract

This investigation concerns native Irish English accent perception in American English speakers. Previous literature suggests that the amount of exposure to a foreign language or accent affects an individual's ability to accurately perceive an accent other than one's own. For example, a listener who is more familiar with an accent (e.g., has been exposed to it longer and/or more frequently) is likely to more accurately perceive the accent. To investigate these claims, nineteen participants from the University of Arizona listened to eight different audio clips of native Irish English speakers, either from Belfast or Dublin, as many times as they desired. They were asked to score the likelihood that the speaker in the audio clip was a native Irish English speaker (as opposed to a speaker of a different accent, or a speaker attempting to mimic an Irish English accent) on a Likert scale, and to write down qualitative information explaining why they had given that score. All audio clips but one were judged to likely contain an Irish English speaker. Participants tended to give higher Likert scores to audio clips that contained a confident reader who exhibited distinguishing elements of Belfast or Dublin accents.

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1.0 Introduction

Previous research has determined that a listener's familiarity and/or prior knowledge of

certain accents[1] plays a critical role in accent perception, and that accent background is

extremely impactful on a listener's ability to perceive, distinguish, and categorize accents.

Furthermore, the listener's own accent can affect his/her perception of other accents and their

personal classification of accents (Ikeno and Hansen, 2007, p. 2). Building upon previous

research, this paper presents an investigation of naive listeners' perception of Irish English

accents. The outcome of this investigation relies heavily on participants' previous exposure to

and knowledge of Irish accents, and accents that, to American listeners, may sound

phonologically similar or have the potential to be misclassified as an Irish accent.

1.1 Background

It is important to note that attitudes about accents and accent perception develop over

time. Previous literature suggests that listeners naive to an accent will not be able to perceive the

accent as accurately as a more experienced listener (e.g., a listener that has been exposed to the

accent for a longer period of time or more frequently). This development relies on the key

functions of frequency and the duration of time the listener was exposed to different accents.

Pronunciation of a second language improves with experience in speaking and hearing the

second language-- as such, perceiving and recognizing an accent accurately improves with

experience in being exposed to and hearing the accent (Flege, 1995).Flege (1988) also

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[1] The definition of *accent* proposed by Ikeno and Hansen (2007) is adopted in this paper: Accent is the cumulative
auditory effect of those features of pronunciation which identify where a person is from regionally and socially. The
linguistic literature emphasizes that the term refers to *pronunciation only*; [thus, it is] distinct from dialect, which
refers to grammar and vocabulary as well (Ikeno and Hansen, 2007, p. 1).

investigated accent production and perception in foreign language learning and noted that the

perception of *native language* phonemes evolves through foreign language learning.

In a related study conducted by Flege and Fletcher (1992), it was discovered that both

native and non-native English speakers' perceptions of elicited sentences of English showed

significant differences when the majority of the elicited sentences of English in the set were

elicited by native English speakers (rather than non-native English speakers; Flege & Fletcher

1992). Essentially, a listener will compare a perceived accent in audible speech to their own

native accent. In so doing, the listener's perception of both their own native accent and that of

the foreign accent will evolve in order to accomodate for phonemic differences between both

accents.

This investigation intends to further probe the theory of the evolution of native accent

perception during exposure to a foreign accent. It is expected that, similar to exposure to a

foreign language in the studies cited above, a participant's native accent should evolve with

exposure to a foreign accent. Irish English will be considered in this investigation, as it is

considered to be slightly more unfamiliar to young American students than other types of foreign
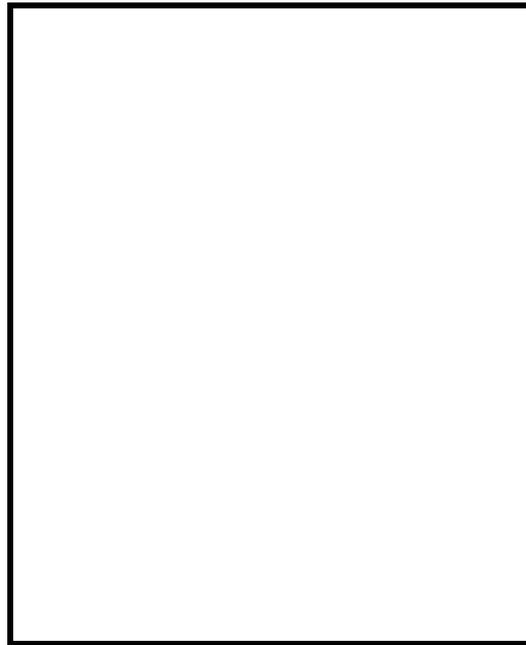
accent.

1.2 Irish English

It is expected that when identifying an accent within an elicited clip (in the specific case

of this investigation, within a read excerpt), and when being prompted for a brief qualitative

analysis on why the specific identification was chosen for an accent, listeners will likely

describe, if in lay terms, phonetic information including manner of articulation of phonemes,

intonation, pitch, volume, and speed of speech. Based on these predictions, it is appropriate to

briefly review Irish English phonetics.

Ireland, though a small country, has a striking amount of regional dialects and accents.

Figure 1 (created by the author from information found in Hickey 2004, p. 5-7) roughly portrays

the approximate zones in which Irish English accents are particularly distinguished from one

another. Due to the isle's small size, it is expected for a great deal of accent exchange to occur,

and therefore, Figure 1 only accounts for the major accent zones, and not necessarily all of the

idiosyncratic qualities particular to each county, town, group, or individual.

Figure 1: *Illustrated accent zones of the Irish Ilse*[2]

It is unlikely that the average young American student would be familiar with all of the

major accent zones of Ireland. Most young native American English speakers living in the

United States (around ages 18-22) are usually exposed to foreign accents through media. This

media typically refers to films and videos available for mass public consumption(i.e., YouTube,

Netflix). Based on a recent article from the popular news and social media platform *Irish Central*

(based in North America), the most popular Irish video producers on online social media (in

terms of viewership and subscriptions) are mostly from Dublin, Ireland, with a remaining

minority based in Belfast (Devlin 2017). That being said, this investigation will focus primarily

on the two major accent zones young American students are most likely to be exposed to through

film and social media: the East (including Dublin) and the North (particularly, Belfast).

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[2] Based on the distinctions in Hickey (2004).

The key phonological and phonetic elements that distinguish the dialects in Eastern Ireland and Northern Ireland will be reviewed. According to Hickey (2004), speakers in Northern Ireland with Ulster-like accents tend to exhibit the use of interdental fricatives for dental stops (e.g. /θ/ instead of /d/). Northern accents typically express the use of a fronted allophone of /u:/ and /u/, i.e. [ʉ(ː)], a noticeable reduction in vowel length distinctions, the use of a retroflex [ɻ] in syllable-final position, greater pitch range between stressed and unstressed syllables, greater allophony of /æ/, e.g. raised variants in a velar environment *bag* [bɛg] and a retracted realization in a nasal environment *family* [ˈfɑmli], and recessive occurence of glides after velars and before front vowels.[3]

Eastern speakers, including Dublin speakers, exhibit fortition of dental fricatives to alveolar stops, e.g. *think* [tɪŋk] , lack of low vowel lengthening before voiceless fricatives (not Dublin), e.g. *path* [pat], front onsent of /au/, e.g. *town* [tæʊn], [tɛʊn], centralized onset of /ai/, e.g. *quite* [kwəɪt], breaking of long high vowels (especially Dublin), e.g., [klijən], fortition of alveolar sibilants in pre-nasal position, e.g. *isn't* [ɪdn̩t], no lowering of early modern /u/ (only Dublin), e.g. *done* [dʊn], and glottalization of lenited /t/, e.g. *foot* [fʊt]→[fʊt̞]→[fʊʔ]→[fʊh][4].

These distinguishing features of Northern and Eastern accents (for relevancy in this investigation generalized to Belfast and Dublin accents) will play a key role in the analysis of this investigation.

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[3] Hickey (2004) p. 5, Table 1
[4] Hickey (2004) p. 6, Table 2

2.0 Method

2.1 Participants

Nineteen students participated in this investigation: 8 males and 11 females. Students

either attended the University of Arizona, Tucson campus, or the University of Arizona College

of Medicine - Phoenix campus. All were current residents of either Phoenix or Tucson, Arizona.

The mean age of all participants was 24.4 years. All participants self-reported proficiency in

American English, though 16 participants (84.2%) self-reported as bilingual, or able to speak

more than one additional language at third-year university level or higher (please refer to

Appendix 5).

Participants who were current students in any linguistics course were offered extra-credit

for participation in this investigation. All participants were asked to complete a metadata survey

before participation (please refer to Appendix 1).

2.2 Stimuli

Stimuli for this investigation included audio files from the Intonational Variation in

English (IViE) corpus (Grabe & Nolan, 2002). The IViE corpus contains audio files from several

locations around the British Isles, the locations of interest for this investigation being Belfast,

Northern Ireland, and Dublin in the Republic of Ireland. These audio files were readings of an

opening passage from Charles Perrault's *Cinderella*, and they also contained accompanying

phonetic transcriptions. Eight audio files of native Irish English speakers were used in this

investigation (please refer to Appendix 3 for a list of the file names): two female speakers from

Belfast, two male speakers from Belfast, two female speakers from Dublin, and two male

speakers from Dublin. These audio files were chosen for use as stimuli in this investigation for

several reasons. Firstly, out of all audio files available on the IViE corpus, these were the most

clear in terms of audio quality, with the least amount of distracting background noise. Secondly,

four female speakers (two from Belfast and two from Dublin) and four male speakers (two from

Belfast and two from Dublin) were selected to balance gender representation in the stimuli for

the investigation. Although the researcher did not anticipate any effects distinguishing accent

perception through gender, the genders were equally represented to account for any possibility of

this. Thirdly, although there were additional audio files of speakers reading different passages of

Cinderella, the opening passage was chosen over other possible choices. Often when speakers

are eliciting a story (especially a fairy tale), there is a notorious cadence and intonation used to

dramatize the telling of the story (even if this cadence and intonation is indeed subconscious).

The goal of using the opening passage of *Cinderella* was to expose the participant to a

somewhat dramatized form of an Irish English accent-- something they might be more familiar

with through media such as film, internet video, radio, etc. As noted previously, previous

exposure to (and therefore familiarity with) an accent is a key element affecting overall accent

perception-- therefore and as noted earlier, given that the most likely sources of exposure to Irish

English accents for young college students living in America are through film and social media,

an audio except was chosen that most matched what the participants would have likely been

exposed to previously.

　　　The researcher predicted that not all audio tokens would be rated confidently as native

speakers of Irish English, and neither would all be rated confidently as non-native speakers of

Irish English. This is partly due to the use of the Likert scale in order to quantify accent

perception results-- the Likert scale would probably encourage participants to assume that not all

tokens indeed contained native speakers of Irish English.

2.3 Procedure

Participants were seated in a quiet room, individually, and asked to listen to a series of

anonymized audio files on a computer (MacBook Pro 2014 model) through headphones

(Sennheiser HD 201). All audio tokens contained a native speaker from Belfast or Dublin,

Ireland (please refer to Appendix 3). The researcher controlled the computer and what audio files

were currently playing.

Each participant was given a pencil and a piece of paper with eight blank Likert scales on

it, and space below for comments (please refer to Appendix 2) to record how likely the accent

they were hearing was that of a native Irish English speaker. The Likert scales were valued from

1.0 to 5.0, and used to quantify accent perceptions reported by the participants. The closer the

reported value on the Likert scale was to 5.0, the greater the likelihood, in the participant's own

opinion, that the accent was that of a native Irish English speaker.

The researcher randomized the order the audio files played for each participant. Each

participant was allowed to listen to each audio file as many times as he, she, or they wanted to--

however, once the participant moved on to the next audio clip, he/she/they was not permitted to

listen to any previous audio clips. After listening to each audio clip, the researcher prompted the

participant to indicate on the given Likert scale the likelihood that the speaker was a native

speaker of Irish English vs. a non-native speaker or someone who is imitating an Irish English

accent (1.0 being not very likely and 5.0 being very likely). They were told they could circle or

place a mark anywhere on the scale between 1.0 and 5.0.

Underneath each Likert scale was a blank space for the participants' comments. The

participants were all asked to explain the reasoning behind their Likert scale report. An example

given on the Likert scale (please refer to Appendix 3) encouraged them to describe general

phonetic, intonational, and tonal qualities of the audio file to justify their report. The participants

were not told that *all* audio tokens contained native speakers of Irish English-- therefore, the use

of the Likert scale to quantify accent perception may have indirectly prompted participants to

assume that not all audio tokens were necessarily native speakers of Irish English. This was done

in order to discover what type of accent is generally perceived as Irish English by young

Americans and how well their qualitative categorization of that accent fits with its reported

phonetic qualities.

3.0 Results and Discussion

Because this investigation is primarily concerned with accent perception as a function of

exposure, it is important to note that most participants reported being unfamiliar with the specific

characteristics of an Irish English accent at the same time as being equally certain that they had

heard Irish English before. Given this, prior exposure to Irish English can be seen as essentially

equivalent across participants and any effects of exposure reported below are due entirely to

exposure to the accents over the course of the experiment.

3.1 Quantitative Data

Table 1 below shows the Liket ratings given by all 19 participants to all 8 audio clips.

Please refer to Appendix 6 for a table depicting all Likert rating values given by each participant

for each clip.

Each audio clip is represented by its file name given in the IViE corpus (Grabe & Francis

2002). Audio file names beginning with "b" (e.g. <b-rea1a-f1>) designate that the speaker in the

clip is from Belfast, Ireland, while audio file names beginning with "d" (e.g. <d-rea1a-f1>)

designate that the speaker in the clip is from Dublin, Ireland. Audio file names ending with "f#"

(e.g. <b-rea1a-f1>) indicate the speaker is female, while audio file names ending with "m#" (e.g.

<b-rea1a-m5>) indicate the speaker is male.

Table 1

Average Likert scale ratings for all clips

The averages shown above in Table 1 t indicate that participants' likelihood ratings were

markedly similar across all clips. Except for <d-rea1a-f1>, all clips were rated above 2.5 (the

midway point in the Likert scale), indicating that participants perceived the speaker to be more

likely a native speaker of Irish English than not. These results also reveal some degree of

uncertainty as no speaker average was higher than a 3.5. These results may be a function of

exposure to the various accents over the course of the study,such that that participants used

linguistic information from previous clips (likely using whichever clip they listened to first as a

primary reference) and correlated and compared it with new linguistic information received

whenever they listened to new clips. Though the participants were not told that *all* audio clips contained native Irish English speakers, overall, the audio files were judged more likely to contain Irish English speakers than not.

Figure 2: *Likert scale ratings for all clips*

When examining all scores given by participants to all audio files, it is clear that there was an extreme amount of variation in the given scores of the majority of clips. There were only two audio clips that were never given a score of 5.0: <b-rea1a-m5> and <d-rea1a-f1>. There were also only two audio clips that were never given a score of 1.0: <b-rea1a-m5> and <d-rea1a-f2>. Interestingly, <b-rea1a-m5> was the only clip to be scored neither 1.0 or 5.0. Likewise, all other clips were rated at least once as both 5.0 and 1.0, indicating that there were no consistent ratings for any one speaker except for <d-rea1a-f1>. Figure 2 above displays the fact that the results of this investigation did indeed result in wide margins of error pertaining to the

Likert scores given to each clip. Despite the wide margins of error, it is interesting that <d-rea1a-f1> is one of the two clips that was never rated 5.0. The significance of the low score of <d-rea1a-f1> (including, theoretically, the fact that it was never rated 5.0) was tested below.

To test the statistical significance of the averages shown above, a linear mixed effects model was used in order to ascertain percent differences in Likert scores between the different audio clips. The mixed model was used for two reasons: firstly, in this investigation, there was only one dependent variable (that is, how likely the clips are Irish). Secondly, this data set may be considered as a repeated measures data set-- although the order of the clips was randomized for each participant, every participant provided a Likert rating for *all* of the clips. Thus, the order in which participants listened to the clips does not affect the statistics reported below: a participant who listened to a clip that they give a high Likert scale rating (e.g., determines that the speaker in the clip is likely a native speaker of Irish English) will bias the following clip just as much as a participant who gives a low Likert scale rating to (e.g., determines that the speaker in the clip is *not* likely a native speaker of Irish English). After each clip, the participant is prompted to rate on a Likert scale how likely the speaker in the audio clip is to be a speaker of Irish English. Referring back to Flege (1988), it is expected that the audio clip prior could influence the Likert ratings of the next clip. The mixed model also allows control for the random effects of the participants.

Table 2

Statistical significance of Likert scale ratings for all clips

As predicted above given the data in Table 1, there is no statistical significance in the

participants rating the majority of clips to most likely contain a native speaker of Irish English.

However, the lowest rating, given to the audio clip <d-rea1a-f1>, does show statistical

significance in differing from the ratings given to the other clips. As shown in the Table 2 and

Figure 2 above, <d-rea1a-f1>, showed statistically significant differences in Likert ratings from

the other clips ($p = 0.006$). This clip, featuring a female from Dublin, was rated least likely to

feature a native Irish speaker. Interestingly, this clip also contained the least amount of feedback

from participants in terms of why they gave it such a low score. The majority of participants

simply explained that it did not sound Irish at all. At least three participants even clearly

described the speaker in an audio clip to sound more "British" than Irish, due to the fact that they

did not hear any "longer" vowels.

These results also show that all speakers were perceived as having an equal likelihood (high or low) of being Irish English speakers. This could further indicate an effect of exposure to the various accents over the course of the investigation. It was predicted that the use of the Likert scale in order to collect quantitative data could potentially influence ratings suggesting that the speaker in the audio file was non-native; however, with the exception of the results of <d-rea1a-f1>, there was no indication that the use of the Likert scale may have influenced the ratings in this way.

3.2 Qualitative Data

As noted earlier, all participants were directed to report the reasons for their their Likert scale ratings. The amount of detail in each response varied both from clip to clip and from participant to participant. The written responses ranged from simply, "not sure," to, "this definitely sounds Irish… with the rounded *r's*, long vowels, as in *down*, and the first stress on the word *CIN-ders*." Only those responses containing sufficient information for the researcher to interpret are considered in the analysis below.

Most feedback included phonetic information prevalent to identifying how likely the accent being heard was Irish. In the written feedback provided by the participants, several words were noted several times by the participants. These were the words, based on the written feedback, on which the participants most strongly based their phonetic qualitative analysis of each audio clip.

Table 3

Transcription of key words in Standard American, Belfast, and Dublin accents

The words listed above all have several phonological properties in common. Firstly, they

are all either one syllable, or the primary stress falls on the first syllable of the word. Secondly,

parties, girls, bride, Cinder, and *gorgeous* all contain the phoneme /ɹ/ or the rhotacized vowels,

/ɜ/ or /ɚ/. Finally, *parties, bride, clothes,* and *downs* all contain either long vowels or diphthongs.

Participants were more likely to give an audio clip a lower score on the Likert scale if

they did not hear what they termed as "long" or "stretched" vowels in these words. They were

also more likely to give an audio clip a lower score on the Likert scale if they did not hear what

they termed as more "rounded" or "hard" "r's" in these words. Finally, if participants did not

hear what they determined to be adequate "stress" or "emphasis" on the words listed above, they

were more likely to give the audio clip a lower score on the Likert scale. In terms of the word

mother, several participants also noted that the /ð/ phoneme was changed to a /t/. If this was

noticed in one clip, but not in another, the participants were more likely to give the audio clip not containing this reduction a lower score on the Likert scale. These phonological and phonetic criteria will be evaluated in linguistic terms below.

To summarize, there were four critical phonetic elements reported several times by several different participants that led them to distinguish that the accent being heard was most likely Irish. These factors included (in the language of the participants, which will be further analyzed in linguistic terms) (1) "long syllables," (2) "rounded" or "hard r's," (3) "stress" or "emphasis" heard in words, and (4) fortition of interdental fricatives to alveolar stops.

In comparison to the earlier summary of the characteristics of Irish English, these four most definitely fall within the range of phonetic identifiers for Irish English. First, the concept of "long syllables" will be considered. Based on the qualitative assessments given by participants containing the words "long" or "stretched" in reference to "syllables" or "vowels," it can be assumed that participants were referring generally to vowel length. According to the aforementioned phonological information of both Belfast Irish accents and Dublin accents, Dublin accents tend to express low vowel lengthening before voiceless fricatives, and Belfast accents tend to express a reduction in the vowel length distinctions (Hickey 2004, p. 5-6). These distinctions can be seen especially in the key words, emphasized by several participants, *bride* and *downs* (please refer to Table 3 for transcriptions). Participants that perceived these distinctions in audio clips were more likely to give a higher Likert score to the respective audio clip.

Secondly, the idea of "rounded" or "hard r's" will be analyzed. It is clear, based on qualitative assessments given by participants containing these phrases, that participants were

referring to the retroflexivity and/or rhotacization of certain vowels and consonants. In section

1.2, it is noted that according to Hickey (2004), Belfast accents will express the use of a retroflex

[ɻ] in syllable-final position. The audio clips chosen for this investigation indeed contained

retroflex [ɻ] (or very similar rhotacized vowel) in syllable-final position, as well as [ɹ], [ɝ], and

[ɚ] that were noticeably more rhotacized than is observed in a Standard American accent. When

participants noted the significant rhotacization of [ɹ], [ɝ], and [ɚ] in syllable final position, they

were more likely to give the clip a higher Likert score. Key words exhibiting these distinctions

include the words *parties, girls, Cinders, gorgeous,* and *mother* exhibit significant rhotacization

of [ɹ], [ɝ], and [ɚ] in syllable final position (please refer to Table 3 for transcriptions).

Thirdly, participants frequently referred to "stress" or "emphasis" heard in certain words.

Unfortunately, the majority of written feedback noting "stress" or "emphasis" heard in certain

words did not include in which words the participant observed this noted "stress" or emphasis."

It is likely, however, that the participants were referring to intonation and pitch of the speakers in

the audio clips. In section 1.2, it is noted that Belfast accents express greater pitch range between

stressed and unstressed syllables, and Dublin accents notably exhibit the breaking of long high

vowels (Hickey 2004). To a naive listener unequipped with more advanced linguistic vocabulary,

breaking of long high vowels and greater pitch range between stressed and unstressed syllables

may reveal themselves as "stress" or "emphasis" in certain words. Participants who noted the

breaking of long high vowels and greater pitch range between stressed and unstressed syllables

were more likely to give the respective audio clip a higher Likert score.

Finally, some participants did note the fortition of interdental fricatives to alveolar stops,

as is most associated with Dublin accents (see section 1.2). Feedback containing this observation

was typically written as, e.g., "'th' to 't' as in 'mother'→'muh-ter'." Participants noting this

observation in audio clips were more likely to give the audio clip a higher Likert score.

In addition to phonetic commentary, there were several common non-phonetic reasons

that motivated participants to give audio clips low scores on the Likert scale. Below is a table

expressing these reasons.

Table 4

Non-phonetic reasons that motivated participants to report lower Likert scores

Difficulty reading text; "stumbling over words"
Lack of traditional "reading" or "fairy-tale" cadence
The accent sounds "too exaggerated;" the accent sounds "like TV Irish"
The pitch and intonation either "varies too much" or sounds "completely monotonous"
The accent sounds too "nasally", too "American", or too "British"

Similarly, participants also listened for these characteristics when giving audio clips high

scores on the Likert scale.

Table 5

Non-phonetic reasons that motivated participants to report higher Likert scores

Consistency in vowel and consonant sounds; little to no variation
"Rhythm" and "confidence" in tone and intonation
Fast speech and/or "slurred" words

Based on the written responses summarized in Tables 4 and 5 above, it can be concluded

that regardless of phonological information, participants still heavily weighed how confident the

reader sounded, and how many mistakes the reader made when deciding on what score to give

each clip. Because all speakers in all clips were native Irish English speakers, it can be assumed

that slower speech, making reading errors, and correcting elicited mistakes were results of the

speaker being unfamiliar with the text, nervous, or perhaps some other result of their

environment.

4.0 Conclusion

      Although the average Likert scores indicated that the majority of audio clips were

determined to more likely contain a native Irish English speaker, this finding did not result in any

statistical significance. This finding is likely a function of exposure to various accents over the

course of the study, as predicted in section 1.1, based on previous findings by Flege (1988).

Drawing on the theory Flege (1988) presents, participant's accent perception would have

evolved as they progressed through the experiment. Accent perception evolution likely depended

on how many times the participant decided to listen to each individual clip and how often and/or

how frequently they had previously been exposed to Irish English accents (or any other similar

accent that they might be able to distinguish from an Irish English accent, such as a British

English or Scottish English accent). A theoretical future continuation of this investigation may

include noting how many times each participant decided to listen to each audio clip, and

determining if this at all had an effect on the Likert scores given to the respective clips. The

ratings from each participant could also be examined to determine if the scores on consecutive

clips were higher than the previous ones (this would thus indicate theoretical learning through

exposure).

Although there were no significant differences in regards to the average Likert scores of all clips, one audio clip, <d-rea1a-f1>,did show statistical significance in being determined to *not* likely contain a native speaker of Irish English (where $p = 0.006$). This was one of the only two clips to not have been scored with a Likert rating of 1.0.

In summary, the main phonological reasons participants gave *high* Likert scores to audio clips were (1) low vowel lengthening before voiceless fricatives or a reduction in vowel length distinctions, (2) significant rhotacization of [ɹ], [ɝ], and [ɚ] in syllable final position, (3) breaking of long high vowels and greater pitch range between stressed and unstressed syllables, and (4) fortition of interdental fricatives to alveolar stops. Upon comparing <d-rea1a-f1> to the other audio clips used in this study, it is clear that <d-rea1a-f1> does exhibit these phonological elements, but neither with the consistency nor to the degree as observed in the other clips, which most certainly contributed to its low overall Likert score.

Furthermore, the main non-phonetic/non-phonological reasons participants gave *low* Likert scores to audio clips included (1) difficulty reading text/"stumbling" over words, (2) lack of traditional "reading"/"fairy-tale" cadence, (2) "too exaggerated" of an accent, (3) too much/too little variation in pitch/intonation, and (4) accent was clearly identified as another accent. The audio clip <d-rea1a-f1> clearly exhibited (1) difficulty reading text/"stumbling" over words, and based on the qualitative feedback (having been clearly identified as a "British" accent by 3 participants) received, and (4) accent was clearly identified as another accent. These two characteristics also certainly contributed to the audio clip's low overall Likert score.

In conclusion: firstly, this study supports Flege's (1988) theory that accent perception evolves over exposure time based on the statistical analysis of how each audio clip previously

listened to by a participant influences the participant's perception of the clip they were currently listened to at the time.

Secondly, a naive listener is more likely to determine an accent is likely Irish based on if the listener observes low vowel lengthening before voiceless fricatives or a reduction in vowel length distinctions, significant rhotacization of [ɹ], [ɝ], and [ɚ] in syllable final position, breaking of long high vowels and greater pitch range between stressed and unstressed syllables, and fortition of interdental fricatives to alveolar stops. Listeners also expect to observe confidence and smooth speech when identifying any sort of accent, as opposed to mimicry.

Further investigation on this subject is necessary to determine the true *accuracy* in accent perception of listeners. Though all clips but one were overall correctly judged to likely be Irish, no one participant scored all clips as likely containing a native Irish English speaker, nor scored all clips as not likely containing an Irish English speaker. Extended time on this investigation would have yielded further statistical analysis of individual participants' Likert scores in order to determine individual accent perception accuracy.

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Appendix 1: Pre-Experiment Survey

1. Name

2. Date of birth

3. Place of birth

4. Place of current residence

5. Native language

6. Other languages spoken (if any)

7. How often are you exposed to accents that differ from your own? Please be specific.

8. What do you believe are some characteristics that might distinguish an Irish accent from

   another accent? Please be specific.

Appendix 2: Investigation Apparatuses - Likert Scale Questionnaire

Participant Name:
Directions: In each of the following clips, you will hear a person speaking with an Irish English accent. Using the scale shown, rate how likely it is (**1 being not very likely and 5 being very likely**) that the speaker is a native speaker of Irish English vs. a non-native speaker or someone who is imitating an Irish English accent. *You can circle or place a mark **anywhere** on the scale between 1 and 5.* Underneath the scale, please provide the reasoning behind your ranking. Please include those qualities of the speaker that drove your decision, including those qualities that you feel are characteristic of a native Irish English accent. Please use the **example** ranking of an Italian accent below as a guide.
      "I think it's very likely that this is a native Italian accent, because of the up-and-down rhythm and tone of the speaker, the trilled "*r's*," and how loud he is speaking."

Appendix 3: List of Audio Files from the IViE Corpus

<http://www.phon.ox.ac.uk/files/apps/IViE/>

1. <b-rea1a-f1>   female, Belfast

2. <b-rea1a-f2>   female, Belfast

3. <b-rea1a-m5>   male, Belfast

4. <b-rea1a-m6>   male, Belfast

5. <d-rea1a-f1>   female, Dublin

6. <d-rea1a-f2>   female, Dublin

7. <d-rea1a-m2>   male, Dublin

8. <d-rea1a-m6>   male, Dublin

Appendix 4: Transcript of Passage Read in Audio Files

Once upon a time there was a girl called Cinderella, but everyone

called her Cinders. Cinders lived with her mother and her two

stepsisters, called Lily and Rosa. Lily and Rosa were very unfriendly,

and they were lazy girls. They spent all their time buying new clothes

and going to parties. Poor Cinders had to wear all their old hand- me-

downs, and she had to do the cleaning. One day, a royal messenger came to

announce a ball. The ball would be held at the Royal Palace in honour

of the Queen's only son, Prince William. Lily and Rosa thought this was

divine. Prince William was gorgeous, and he was looking for a bride. They

dreamed of wedding bells.

Appendix 5: Participant metadata

	Gender	Place of birth	L1	L2
A	F	Flagstaff, AZ	English	French
B	F	Rock Springs, WY	English	Russian
C	M	Gilbert, AZ	English	Russian
D	F	Philadelphia, PA	English	Spanish
E	F	Pasadena, CA	English	French
F	M	Yuma, AZ	English	Spanish, Russian, Kazakh
G	M	Tucson, AZ	English	English
H	M	Los Mochis, Sinaloa, Mexico	Spanish	English, Portuguese
I	F	Fullerton, CA	English	--
J	M	Mexico	Spanish	English
K	F	California	Spanish	English
L	F	Torrance, CA	Spanish	English
M	M	Brownsville, TX	Spanish/English	Romanian, Farsi, Arabic
N	F	Vietnam	Vietnamese	English
O	M	Phoenix, AZ	English	Spanish, Farsi, Persian
P	F	Phoenix, AZ	English	--
Q	F	Los Angeles, CA	English	Spanish, Greek
R	F	Tucson, AZ	English	--
S	M	Ganado, AZ	English	Navajo

Appendix 6: All Likert scale ratings for all audio clips

Participant	b-rea1a-f1	b-rea1a-f2	b-rea1a-m5	b-rea1a-m6	d-rea1a-f1	d-rea1a-f2	d-rea1a-m2	d-rea1a-m6
A	2.2	4.2	1.3	4.3	3.5	3.9	4.8	1.9
B	1.9	4.9	2	4.9	2.7	3.1	4.3	3.7
C	3.9	2.4	3.7	4.7	3.3	1.6	3.8	4.9
D	4	4	4.5	2	1.5	3	2	3.5
E	2.3	3	1.5	4.5	4	4	4.5	5
F	1	1	3	2	1	4	5	5
G	5	1	5	1	1	5	1	1
H	1	5	2	5	1.5	2	1.5	3
I	4	1	2	2	1	3	2	4
J	1	5	2	5	1.6	2	4	4
K	3.5	5	4	5	1	2	2.9	4.9
L	4	4.5	1.7	3.4	1.5	3.7	1.5	2.5
M	5	5	1.3	2	1.5	4	2.1	2.5
N	4.7	1	2.5	1	3	3	3	2
O	2.5	1.3	2.3	3.9	4.2	4	1.3	1.5
P	4.5	4.5	3	2.5	3	3.6	3.5	4.5
Q	3.3	1.9	1.9	3.5	1.5	1.9	5	4.7
R	4.4	4.9	2.7	2.1	1.3	2.1	3.5	4
S	2	1.5	3	2	1	5	4.1	5