Towards an Integrated Perceptual Sociolinguistics

Colin Sullivan
Senior Thesis, Haverford College
Department of Linguistics, Swarthmore College
Fall 2006

Abstract:

How is it possible that we can tell whether someone is from New York City or Texas or Minnesota simply by listening to their speech? The fact that ordinary people have no trouble with this task is a minor miracle! Sociolinguists and dialectologists have ignored the ability of naïve listeners to distinguish one dialect from another and to attach them to a specific geographical region. Recent work done by Clopper (2004), Preston (1999), and Thomas (2002), has begun to address the role of perception in dialect recognition, synthesizing techniques from phonetics, psychology, and even forensics. The New Integrated Perceptual Sociolinguistics (IPS) research indicates that naïve listeners accumulate knowledge about language variation and are able to apply this knowledge to wide variety of tasks relating to dialect perception.

This paper reviews these studies and other previous research in perceptual dialectology and sociophonetic work, and discusses their experimental methodologies. Using this information as background, I designed a pilot experiment involving dialect perception by naïve listeners. The goal of this paper is to investigate naïve intuitive knowledge of dialects from a perceptual perspective in the hopes of scrutinizing our instinctive knowledge about language variation.*

I. *Introduction*

Intuitively, we all know that people throughout the United States do not speak the same variety of English that we hear in our communities and at home. We know that even though we are speaking the same language, elsewhere it sounds "different" on some level. Language variation is not some new phenomenon that has sprung up, but has been well documented by dialectologists and sociolinguists (e.g. Labov, 2001). It is no surprise to us that the English language is not spoken identically everywhere.

While it seems obvious that people from different communities may distinctive speech, the consequences of dialect contact affect our lives almost daily. Dialectal differences are a part of our cultural awareness and allow us to make judgments about people we encounter. It continually attracts our attention whenever we hear someone from outside our community speak. Indeed, Joking remarks that someone from Tennessee pronounces *pen* and *pin* the same way, that others say *caught* and *cot* identically, and that some distinguish both these pairs are a common experience. Anecdotes that Bostonians drop their *r*'s, yet Texans add them, or that New Yorkers say *cwuofee*, and that people in Minnesota and North Dakota say their *o*'s funny are examples of the types of expectations that normal Americans might have in their minds when they listen to a foreign dialect. We do not simply say that people from different parts of the country sound "strange", but are attentive to the exact ways in which different dialects sound distinct. As a result, colloquial vocabulary has developed to express ideas such as Southern speech being "twangy". This awareness is present in everyone and does

not require any special training in linguistics or the ability to speak more than one dialect. Clopper (2004: 21) has summarized this phenomenon:

> The body of research on the perception of dialect variation leads to one overwhelming conclusion: naïve listeners can make reliable judgments about where an unfamiliar talker is from without explicit instructions about what to listen for. This perceptual ability suggests that listeners retain a memory of the varieties of their native language and that these representations develop naturally through a person's experience with and exposure to his community and the world at large.

The way in which we gain and apply this type of knowledge is still relatively unknown, but is beginning to be unraveled by researchers.

The perception of dialects has been ignored until relatively recently, and researching this behavior takes many different approaches. Sociolinguists and dialectologists have devoted much attention to giving technical descriptions of dialects phonetically, and exploring general questions about language attitude, stereotypes, and how they may affect the workplace or classroom. However, variationist sociolinguistics has overlooked the role perception plays and focused on the broad consequences of language variation in society. This distinction is subtle, but crucial, because it neglects how speech variations are processed by listeners in order to create these social biases (Clopper, 2004). At the other end of the spectrum, speech scientists have traditionally investigated the acoustic properties and parameters of the speech signal recognized by the brain and have not devoted significant attention to the wider aspects of perception cross-dialectally.

However, a new field comprised of techniques from dialectology, sociolinguistics, psycholinguistics, phonetics, forensics, and applied linguistics is emerging with the goal of investigating the nature of our knowledge about different dialects. A multitude of

questions can be raised about this knowledge, for example: How is this type of knowledge acquired? What kind of knowledge about a dialect is utilized when listening to an unfamiliar dialect? To what extent does the level of exposure to different dialects affect perception? In what ways do expectations about the speaker's regional dialect affect perception? How well can listeners to distinguish among dialects and link them to different geographical regions? What features of a dialect are noticed first? What kind of information can be gleaned from parody imitations of different dialects by outsiders? What role does speaker gender and ethnicity play in dialect perception? These questions are broad in scope, yet already researchers have some notion of the answers.

The shift in focus within aspects sociolinguistics and traditional speech processing has lead to the establishment of a new subfield of linguistics investigating dialect perception. Since no formal name has been attributed to this type of research, I refer to this subfield in this paper as **Integrated Perceptual Sociolinguistics** (IPS). Section 1 of this paper begins by laying out the foundations of IPS and reviews the research techniques used to examine these questions. The discussion IPS research will include an analysis of the methodologies and assumptions contained within individual experimental procedures. An analytical assessment of each technique is given along with an account of the results.

Section 3 outlines the methodology and procedure of an original pilot experiment and discusses the theoretical and pragmatic challenges encountered while carrying out this experiment. Finally, Section 4, evaluates the results of this experiment situated in the context of other IPS research. The aim of this paper is to give an account of

Integrated Perceptual Sociolinguistic research, its methodologies, and discuss possible the new directions it may take with the addition of an original pilot experiment.

2.0 *Foundations of IPS*

2.1 *Overview*

While there is no acknowledged expert in Integrated Perceptual Sociolinguistics, Clopper (2004) and Thomas (2002) have effectively laid out the scope of IPS and established the following main objectives:

(1) Understanding how naïve listeners conceptualize and organize language variation in the environment into mental representations of dialects.

(2) Assessing the ability of listeners to identify or correlate the dialects of a speaker with a geographic region.

(3) Determining which features of a dialect are the most salient for naïve listeners to be able to distinguish it.

(4) Evaluating the influence of expectations and stereotypes on the perception of sounds within a dialect.

(5) Examining the ability of listeners to translate perceived linguistic variability into knowledge about production of foreign sounds.

This burgeoning field has yet to codify the principles and goals of the discipline, and the fact that researchers are approaching it from so many different backgrounds makes the task rather complex. A review of the many research techniques incorporated in IPS emphasizes the diversity of the methodologies and the necessity for careful experimental design. Thomas (2001) points out that research investigating dialect perception tends to be very demanding with respect to detail in experimental design, yet data analysis is less

intensive than in other fields of linguistics. Isolating the desired aspect of perception to be investigated is one of the principle difficulties in IPS, which may explain the relative deficiency of perceptual research in linguistics until now.

2.2 *Conceptualization of Dialects*

Research investigating how dialects are organized and conceptualized in the mind fits within the branch of linguistics called Perceptual Dialectology or Folk Dialectology: The word *folk* brings to mind a sense of class and the common tradition which invokes inaccurate notions of the field. Researchers are interested in the accumulated mental set of dialects and their features used by listeners to organize the linguistic variation into separate categories. Experiments in this area usually incorporate map drawing tasks or questions directed at dialect consciousness. Studies usually entail the demarcation of dialect boundaries on a map and do not require that speech samples be presented to the subjects, but instead rely only on their stored internal mental representations of dialects and their distinctive features. It can be better described as perceptual dialectology.

In an experiment designed by Preston (1986) naïve subjects drew lines on a map of the United States to indicate "where people speak differently". Preston's map drawing experiment allowed the subjects to choose their own system of categorization and utilized a "free classification" test, which was originally developed for research in cognitive science. Free classification tests sometimes ask subjects to organize dialects into a set number of categories in order to discern the most significant dimensions of classification. Others allow subjects to be as specific or broad as they choose with no requirement for the number of separate categories. The main goal of free classification tests is to gain insight into the number and system of organization of mental representations, and

accomplishes this by not introducing criteria of categorization within the questions put to the participants. An example of an experiment that violates free classification would ask the participants to mark in which states people have 'Southern', 'Midwestern' and 'Northern' accents. This introduces a constraint on subjects to make their own internal representations fit within the parameters laid down by the experimenters. Subjects may internally have organized language variation into some other system that does not directly distinguish 'Southern' and 'Midwestern'. By giving as much freedom as possible to the participants, researchers can glean information about the principles employed by naïve participants to sort linguistic variation. Not surprisingly, Preston's map drawing study demonstrated that the maps created by naïve listeners did not match up with the boundaries or categories sociolinguists had found in their research.

One of the patterns Preston noticed in his first set of experiments was that level of detail was more granular and discriminating nearer to a subject's hometown. He found that there was a direct correlation between the distance away from the subject's hometown and number of distinctions in people's speech. The closer to the speaker, the finer the divisions. However overall, were consistent in their classifications of dialects for regions far away from their community. The varied level of detail in the results merely shows that people are more aware of the distinctions between the dialects to which they are more often exposed (Preston, 1999). Participants in New Jersey made a distinction between New England and Mid-Atlantic speech while those in Atlanta did not, because participants in New Jersey had more experience and exposure to the local varieties leading to finer category distinctions.

Experiments in *dialect consciousness* also using the free classification system have been carried out primarily with rural Japanese Dialects. Clopper (2004) cited an experiment done by Mase (1999), which asked participants to list specific characteristics of other types of Japanese speech that was different from their own (Preston 1999). This method elicited naïve descriptions of how dialects of Japanese differ, once again without imposing any restrictions on the types of distinctions or the level of detail. Mase noted that the descriptions provided by the participants generally related to a specific region or dialect and did not relate to multiple dialects. Essentially, subjects were sensitive to features characteristic of specific dialects and did not notice the absence of a distinctive feature when listening to an unfamiliar dialect. For example, a subject asked in America might list Southern speech as [+drawl], but would not have categorized Northern speech as having the characteristic of [-drawl]. The hypothesis is that naïve subjects attune to specific features of each dialect individually and do not generalize or compare characteristics cross-dialectally to develop a system of categorization.

2.3 *Correlating Dialects with Geography*

The goal of studies correlating dialect with geography is to confirm that people reliably and consistently attribute dialects to corresponding regions. The primary difference between this type of research and the research presented in the previous section is that subjects listen to actual speech samples of regional dialects and then asked to geographically locate each sample individually. Preston (1993) and Clopper & Pisoni (2004) have conducted dialect categorization experiments and found that people are, in fact, able to match dialect with a region with some degree of proficiency.

In Preston (1993), naïve listeners in Indiana and Michigan were presented with nine speech samples from speakers living in nine cities forming a north-south transect across the US, and asked to match each sample to speaker's city of residence. He found that listeners were very poor at matching the actual native of each speaker but that they were able to make broad distinctions between Northern and Southern speech. In essence, they may have mixed up which cities corresponded to which speaker, but they were able to group Southern speakers together and Northern Speakers together. One interesting observation was that the boundary between North and South was different for listeners from Indiana versus listeners from Michigan. Indiana listeners placed the boundary further south, clearly indicating themselves in the Northern region, while the responses from participants in Michigan placed the boundary further north, including parts of Indiana.

Clopper & Pisoni (2004) designed an experiment where naïve listeners in Indiana were presented with speech samples from six regions of the United States and asked to match each sample with one of the six regions. The overall accuracy by naïve listeners was only 25%, yet above chance (17%) and statistically significant. This experiment used forced-choice categorization by presenting the subjects with a map depicting the six dialect regions (Clopper, 2004). When the data was tabulated using a map with 3 broader categories (South, Midland/West, New England) instead of the six smaller regional categories, the performance of the listeners greatly improved. Clopper & Pisoni then went back and performed acoustic analysis on the samples in an attempt to determine which features the listeners were recognizing. They found using regression analysis of 11 different segmental measurements that each regional dialect contained reliable

phonetic markers that were available to the naïve listeners. They found that[r]-lessness was a strong predictor of New England speech as well as /æ/ backness. /ou/ offglides and /aɪ/ monophthongization were strong predictors of Midland speech, while intervocalic fricative voicing and /u/ fronting were connected to the typical Southern dialect. Based on these results Clopper and Pisoni confirmed Preston's previous work that naïve listeners are able to match specific acoustic cues with broad geographic regions. The fact that naïve listeners were able to correctly match speech samples with dialect regions to a degree better than chance, seems to indicate that subjects were able to attune to some phonetic cues. However, it may be that the speakers were not applying the cues found by Clopper and Pisoni, and instead were basing their categorizations on intonation contours or consonant articulations. Other researchers have slightly altered this procedure to test which features specifically are helpful to naïve listeners.

2.4 *Determining the Salient Features for Dialect Discrimination*

IPS research investigating the salient features involved in dialect discrimination is perhaps the most important for answering the question: How do we build the conceptualizations of dialects in our mind for later use when matching a given speech sample to our internal representations? Here researchers are interested in the phonetic and phonological features picked up by naïve listeners during dialect conceptualization, and the subsequent application of this knowledge when presented with new speech to process.

Van Bezooijen & Gooskens (1999) tested naïve listeners of both British English and Dutch and attempted to present different kinds of phonetic information to the listeners to see which level was the most important for successful matching. Speech

stimuli were altered in several ways to determine which information is the most crucial for listeners. One group of subjects was presented with stimuli that had been distorted using a low pass filter at 350 Hz to render it unintelligible, but maintaining the prosody of the speech. Another group of participants received the same speech samples, which had been electronically monotonized by setting the pitch contour to the F_0 (i.e. removing all prosodic information). The speech was completely intelligible, but lacking in any expressive qualities as well as intonation contour in order to test whether the actual articulation of individual segments were being attuned to. A final group was presented with unaltered speech stimuli, which contained both prosodic and segment pronunciation information. Each group was asked to complete a similar task similar to the one used in Clopper and Pisoni (2004) and match the speech stimuli to specific regions in either the Netherlands or the UK.

The results of Van Bezeoijen and Gooskens experiment indicated that phonemic information contained within the pronunciation of phonetic segments was the easiest for listeners to process and match with corresponding regions. That is, the cues in the monotonized speech stimuli yielded the most correct correspondences, indicating that listeners were most comfortable classifying the samples based on the articulation of the phonemes. However, it was noted that based solely on prosody listeners were still able to match dialect region correctly at a rate slightly above chance. In addition, listeners had greater difficulty when both the prosodic and segment information was provided in the unaltered speech stimuli. Somehow, the combined information inhibited the listeners' ability to correctly match the samples to the dialect based solely on pronunciation. Thomas' review of this study also remarks that English listeners relied more on prosody

in their judgments of British dialects than did Dutch listeners for dialects of Dutch (2002). This seems to point toward the idea that naïve listeners of different languages use different means to make their judgment. This finding makes sense intuitively, since some languages have more prosody than others and we would expect listeners to use those features that are most prominent in their languages to distinguish dialects.

In similar experiment, Plichta and Preston (2003) tested whether listeners differentiate dialects based solely vowel diphthongization as the targeted cue. Using the same north-south transect from Saginaw, MI to Dotham, AL from Preston (1996), they tested a continuum of the vowel sound /aɪ/ as in the word *ice*. Using a speech synthesizer they created 9 different samples of the word 'guide' with varying degrees of monophthongization to explore how it would be correlated along north-south continuum. In this experiment, whether the participants matched the sample to correct city was not and important factor, but instead investigated only whether the feature of vowel diphthongization was involved in dialect processing. The goals were to determine whether monophthongization is important to listeners for classifying variations along the north-south dimension and to determine whether some categorical breakpoint exists at which variants were classified as either north or south.

Plichta and Preston found that monophthongization operated as a gradient within northern and southern regions, but that there was a breakpoint separating these two classifications. In essence, subjects first classified the word 'guide' as belonging to either Southern or Northern regions, and secondly attempted to represent the degree of monophthongization in a gradient continuum within each category. This study confirms the hypothesis that the degree of vowel monophthongization is a robust cue for dialect

categorization for naïve listeners. The synthesized /aɪ/ vowels may not match the actual vowels produced by speakers from the 9 cities along the north-south transect, but naïve listeners do associate a certain level of monophthongization with the southern variety. Preston and Plichta's experiment, overlaps to some degree with research investigating stereotypes and expectations.

2.5 *The Role of Expectations and Stereotypes*

. Many studies have in the psycholinguistic arena show that our expectations about a speaker will affect our perceptions of speech, and this type of methodology is now being applied to research in IPS. This research investigates the ways in which our perceptions might not match up directly with reality. Psycholinguistic research has shown that expectations about speaker gender or ethnicity affect our judgments of speech stimuli, but Niedzielski (1999) was the first to apply this to dialect perception.

Niedzielski presented speech samples of a Detroit native speaker to naïve listeners from the Detroit area and asked them to match the vowels they heard in the samples with synthesized vowel tokens. The listeners were divided into two groups. One group was told they were listening to a Detroit native's speech, while the other group was told the speaker was from Canada. The goal was to see if the choices made by the listeners would be affected by expectations about the speaker's region. Niedzielski was able to conclude from the results of the experiment that listeners do, in fact, use social information in speech perception.

The group expecting to hear Canadian speech consistently matched the vowels from the samples with raised segments like /aw/, typical of a Canadian dialect. Even though they were presented with un-raised vowels in the stimuli, the expectation of a

Canadian accent altered their perceptions and caused them to misidentify the vowels uttered by the speaker. The group that was expecting a Detroit speaker also showed unexpected results. While they did not match the perceived vowels from the samples with synthesized typical Canadian vowels, they likewise did not match them with typical Detroit vowels either. Instead, they chose qualities that matched widespread American forms more than they chose qualities that matched a typical Detroit dialect. Thomas summarizes "[this] finding apparently resulted from the fact that most Detroit residents do not recognize the distinctiveness of their own speech and hence harbor preconceived notions that their speech is unmarked for dialect features"(Thomas 2002). Thomas (2002) cites research by Labov et al. (1991) who have noticed a disconnect between vowel qualities produced by speakers and the vowel qualities perceived. Labov had documented cases where communities still maintain a distinction between two vowels in production, but are unable to differentiate them in perception. This evidence points toward the conclusion that our expectations have a greater impact in our perceptions than we have realized before. The assertion that producing speech obeys rules that do not match rules for perceiving speech is bewildering. This becomes problematic especially when attempting to understand how naïve listeners might translate knowledge about perceived variations into knowledge about the production of foreign dialects.

2.6 *Translating Perception into Production*

One other approach to understanding dialect perception is to investigate the ability of non-native, naïve speakers to produce or imitate a dialect. Dialect parodies and imitation tasks allow researchers to make conclusions about how a naïve speaker thinks about a dialect on the level of production. Experiments in this vein have come from the

perspective of forensic linguistics with the intention of determining how well a non-native speaker of a dialect may hide their identity though imitation. The results of these experiments are easily transferable to the investigation of dialect perceptions.

Markham (1999) investigated ability of naïve dialect imitators to fool phonetically trained listeners. The speakers were asked to perform imitations of certain dialects of Swedish and the recordings were then presented to the trained listeners. The listeners attempted to guess whether the speaker was imitating the dialect and if so to guess as to the actual native dialect of the imitator. The results of the experiment demonstrated that there is wide variation in the ability of naïve speakers to convincingly perform imitations of dialects. Some speakers were able to deceive the listeners for one target dialect, but failed for others. In addition, even though the listeners were trained phoneticians, they mistakenly accepted some imitations that contained many errors by the imitator. Listeners were more likely to judge the samples as imitations if the contained excessive use of dialect markers rather than minor inconsistencies that would indicate more than one dialectal influence. In other words, imitations that went over the top and over applied a marker of the dialect were easily recognized as fake by the listeners. Markham concluded that convincing imitations of a target dialect are possible though some individuals were more successful than others and often were most successful (i.e. had a talent) with one particular target dialect.

Another imitation experiment performed by Segerup (1999) focused more on the attributes of the imitations in relation to the target dialect rather than on judgments of their naturalness. Segerup did an acoustic analysis of the target dialect (West Swedish) and identified characteristics that are robust in the dialect, and likely to be imitated by

naïve speakers. The elicited imitations were subjected to a similar acoustic analysis and phonetic segments were quantitatively judged to belong to the target dialect, the native dialect, or whether it did not belong to either. Like Markham, Segerup found that imitators were able to produce approximate articulations for many phonetic features like vowel quality, intonation pattern, and unique consonants. The acoustic analysis showed that speakers were not able to completely shift to the target dialect and that measurable traces of their native dialect were still present in many features. Segerup noted these traces, which showed up in the acoustic analysis, were very difficult to hear by just listening to the samples. Imitations judged as successful sounded much closer to the target dialect than one would expect from the acoustic analysis. Segerup writes, "The existing coloring [or acoustic traces] from the source dialect does not interfere with the impression of successful imitation due to the native-like imitated features"(1999). This was most apparent in vowel quality, as imitators were only able approach but not match the formant frequencies of the target dialect, and what they actually produced fell somewhere in the range between their native dialect and the target. Segerup concluded that, for imitations of Swedish, vowel quality was the most important attribute for giving the impression of a native speaker.

The results of these two experiments have clear implications for our knowledge of dialect perception. In both cases imperfect imitations of a target dialect were able to convince listeners that they were samples of native speech. It seems that the degree of sensitivity listeners possess is rougher than expected. Remarkably, a native speaker of the West Swedish dialect judged an imitation as native in Segerup's experiment. The acoustic analysis of the imitations shows that naïve imitators have correctly recognized

features of the target dialect and translated this into production in their imitations. While their imitations are imperfect, as Segerup showed, likely these imitators have successfully constructed mental representations about the articulation of features in a foreign dialect. The imperfection may arise from difficulties in motor control, but further research is needed to determine if this is the case or whether their perceptions of the target dialect are imperfect.

2.7 *IPS and New Directions*

The results of all the experiments involved in IPS considered together show that dialect perception involves many different multifaceted and imperfect processes. The conclusions drawn from Integrated Perceptual Sociolinguistics research thus far implies that dialect perception is an extremely complex behavior which depends upon many factors which are difficult to isolate and test experimentally. IPS research remains a new and relatively chaotic field, which, as the experimental techniques are perfected, continues to pursue the nature of dialect perception.

3.0 *An Original Experiment in IPS*

3.1 *The objective of a Pilot Experiment*

A sound experiment in IPS, such as the examples reviewed above, exceeds the resources of this paper; thus, the goal of my pilot study is to move towards an experimental design that could lead to further conclusions and to gain further experience in conducting linguistic studies. This section takes the form of an experimental journal or lab notebook, which outlines the process of designing my experiment, the errors and problems, and the revisions ultimately resulting in a design that will be useful on a larger scale. I do not omit the parts of my experiment that fail and report only on my successes,

but instead I include all the steps taken in the experimental design and execution. The final product of this process is not perfect in the sense that it will provide statistically significant results, but the journey of modification and adjustment has its own inherent educational value. I include all the materials involved in the experiments and notes about the exact procedure with the goal that the reader will be able to replicate my experiment. This endeavor may guide others interested in dialect perception research and I hope they will gain from my experiences and mistakes to further develop the foundations of IPS.

3.2 *Initial Experimental Designs*

After reflecting on the IPS research reviewed above, I decided to perform an experiment that would elicit results similar to the experiment done by Plichta & Preston (2003) showing that degrees of monophthongization corresponding to different ratings of Northern versus Southern Speech). My approach differed in that I planned to use an AxB methodology similar to Niedzielski's experiment (1999). This experiment would focus on just the North South distinction since it is recognized as the most distinct. I planned to individually test 2-3 distinct vowel features in northern and southern speech to determine whether any particular feature was more salient in naïve listener's classifications. With this in mind I decided that single word speech stimuli would be most useful in isolating the target feature in each case. The subjects would listen to the sample and be asked: "Was the word uttered by someone from the North or the South?" This experiment involved a forced classification, not allowing the listeners to choose and option in between Northern or Southern speech. I predicted that listeners would show considerable ability to distinguish between two dialects based on clear feature contrasts and that this would strengthen the conclusion that people perceive dialectal differences and apply this

knowledge to formulate mental representations of dialects with respect to language variation. I unfortunately had to abandon this experiment after learning that typically AxB experiments require extensive acoustic leveling or manipulation of the sound samples to make sure that listeners were relying solely on the target distinctive feature. This would entail leveling the pitch, vowel duration, voice onset time, and other parameters. The process would have been too complex for the short amount of time I had to complete this experiment. It seams reasonable to expect that if this experiment was conducted in the future that the results would agree with my predictions and support the claims made by Plichta & Preston (2003) and Clopper & Pisoni (2004).

I then went about designing a series of mini of experiments that would get a holistic picture of this naïve ability and would utilize spontaneous speech stimuli of a few sentences in duration rather than single word. The rational behind this decision was that people form their mental dialect representations from a variety of markers in the speech and not just on from single features occurring in certain words. The experiment would give listeners a speech sample containing many examples of the distinct markers of the dialect. I had not yet decided what I wanted to elicit from my subjects after presenting them with the speech stimuli, however I expected that my questionnaire would entail several types of questions each with a separate purpose.

The speech samples I used come from two sources: the International Dialects of English Archive (IDEA, 1997), which is intended as a resource for actors trying to learn a dialect for a part in a play or film, and The Speech Accent Archive (2005), which is a general database of speech samples reflecting different accents. The IDEA and Accent Archive databases contain multiple examples of many dialects and have examples of

varying age, sex, and ethnicity. The samples provided by the IDEA are about 4 minutes in length and contain a read passage as well as spontaneous speech, while the Accent Archive is contains only 30 second segments of read speech from a passage. I selected samples from the 3 major dialect regions of the United States as described by Labov et al. (2001). They are: North East (or New England), South, and West/Midland. I took 4 samples from each region and edited them down to a portion of spontaneous speech of about 2-3 sentences with a maximum length of 10 seconds. At the end I chose 12 samples with 4 examples each of the three major categories of American English, 9 of my samples were from the IDEA database and 3 others were from the Speech Accent Archive. Below is a map indicating the actual hometown of each speaker and the three major dialects.

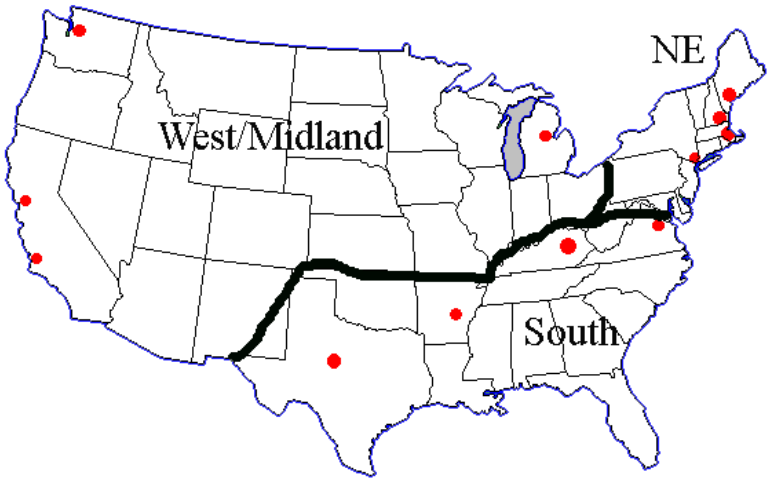


Figure 1

My next task was to find a way to use these samples to extract the information I wanted in a series of mini-experiments. I had 3 goals, which I investigated in 3 separate experiments. (1) Confirm that naïve listeners are able to recognize different dialects and (2) correctly identify them as one of the 3 major dialects of American English. (3) Elicit naïve descriptions of dialects and correlate them with attested dialect markers.

I intended to conduct a quasi map classification task in experiment (1) utilizing a Free-classification framework. First, without presenting any speech samples, I gave the subjects a map and asked them to mark it using colored pens into areas corresponding to 3 kinds of speech. This is restricts them to set number of dialects without putting the categories of "northern, southern, and western" into their minds. I have found that people are not always aware of a difference between western and northern speech and this experiment was able to confirm that this was the case by comparison of the maps they drew. In step (2) I asked them to listen to the speech samples and group each sample into one of the 3 dialect groups. I predicted that this should be a fairly simple task and will provide evidence that people are able to make consistent classifications of dialects within these broad categories.

The goal of step 3 is to obtain a cogent set of naïve descriptions from the participants and determine whether they correspond to attested markers of the dialect. This was the most difficult phase of my pilot. If each individual subject gives unique descriptions of dialects that are not easily grouped with descriptors from other subjects, then making a convincing argument for a connection with attested dialect markers is difficult. The second experiment requires significant modification and revision to elicit the right level of detail and obtain their initial gut reaction. I did not want them to give me lengthy descriptions of the dialect, but merely concise adjectives or phrases. In a similar experiment, naïve descriptions of foreign languages were elicited from beginning phonetics students[1]. The subjects did not speak any of the languages presented and, therefore, were not distracted by semantic factors. I was concerned that English speakers listening to English dialects will have difficulty describing familiar dialects. I was

[1] David Harrison, Linguistics 044: Phonetics Fall, 2006

especially concerned that subjects will have difficulty describing Northern and Western dialects because they would not be conscious of their dissimilarity as stated above. I expected that these two would be closer to "Standard" American dialect in the minds of the participants, and therefore their descriptions would be relatively bland.

After collecting the naïve descriptors I attempted sort them into groups that to corresponded to one another and then made a conjecture as to what dialect marker they might refer to. For example, southern speech in my initial trials is described as 'twangy", "having a drawl', or "rolling". I predict that these descriptors are referring to the vowel qualities in some way, possibly diphthongization or backing or some other parameter.

The final step would be to compile all the descriptors into a set and test my hypotheses concerning the connection between naïve descriptors and actual dialect markers. My attempts to design a way to test these predictions using naïve listeners has been unsuccessful partially due to the difficulties I found with the descriptors themselves and partially due to difficulties in experimental design. I had considered a final separate experiment asking subjects to rate dialects according to each descriptor on a seven point scale, but due to time constraints and experimental flaws I abandoned this final step. However, if I had been able to successfully compile a set of naïve descriptors I would expect that sample from the northern dialect would rate very low on 'twangy', but very high on 'unpronounced *r*'s'. These ratings, however, do not conclusively prove a connection between the naïve descriptors and the attested dialect markers used by trained dialectologists. This is a problem I am still pondering.

3.3 *Procedure*

Please Refer to the Questionnaire in Appendix A

I. *Map Test*

1. Explain that I am investigating dialects of American English and that I am primarily interested in the nature of internal mental representations of dialects.

2. Present a blank map (which includes state lines) and the colored pens and ask them think of the three main types of American speech and mark on the map where each is spoken. I do NOT ask them to divide the map into 3 regions where people speak differently. This allows the participant to have a single dialect spoken in multiple regions. This, it turns out, had quite interesting results. My written directions on the questionnaire were slightly vague, and I had to verbally instruct the subjects to include all the territory in Continental United States into the 3 dialects they chose.

II. *Sample Category Matching Test*

1. While their map is still in front of them I presented the 12 samples one at a time and after each I asked them to categorize it into one of their dialect regions by announcing the color of the region associated with the sample. I recorded their response on a separate sheet of paper, so that they would not see the number of samples to be presented, nor would be influenced by their previous responses to even-out or level the number of samples attributed to each group. This test was fairy simple and the participants did not demonstrate difficulty with decision making.

2. While they read the instructions for the third part I compiled their responses into 3 groups according to color listing each sample under the corresponding color. For example, according to their responses I might have samples 2, 4, 9, 7 listed under the Green group and 1, 6, 11, 8 as the Red group and so on.

III. *Descriptor Test*

1. I play the samples from each group while they listen and write down their descriptors at the same time. Initially I had asked them to wait to write down their descriptors until after they had heard the samples played together, but they seemed to have greater difficulty when this was the case, and that concurrent listening to the samples loosened their imagination. I continued to play the samples as many times as required until they felt they had adequately described the dialect before moving on to the next group. Subjects showed a wide range in their responses with this test and there were several participants that did not understand the kind of description I was asking for.

3.4 *General Comments*

In general, subjects felt as certain level of discomfort with only 3 categories of English and expressed that 4 categories would have fit their mental representations better. However, I think the addition of a category would alleviate the difficult decisions forced upon the participants and would mask many of the implied results. Overall, subjects found the tasks difficult but interesting and liked challenge presented by considering only 3 major categories of speech. After each trial the participants were always eager to discuss their performance and asked to see the maps of other participants to compare with their own. The following section lays out the results of each experiment individually and discusses the methods of my analysis as well as the implications of the results.

4.0 *Discussion of Experimental Results*

4.1 *The Map Test*

The map test, itself, is not a new experiment in IPS, but when the test is combined with the second category matching test, a new picture of dialect perception emerges from the data which has not been shown by other research techniques. The free classification

map test has been done by others, most notably Clopper and Pisoni (2004) and Preston (1986); however, my procedure and results are somewhat different from those described above. Neither experiment limited participants to only 3 categories of English. Preston's procedure revealed the relationship between the degree of detail distinguishing speech and proximity to the participant's hometown. Clopper and Pisoni asked participants to create regional categories based on speech samples, which demonstrated that while the average number of dialects in peoples mind was 7, analysis of confusion matrices indicated the 3 broad categories of West/Midland, South, and Northeast were the most salient distinctions. My map drawing task is a hybrid of these two experiments with a constraint on the number of dialect categories. I asked participants to create their dialect categories based solely on their own internal representations without any exposure to speech samples.

By constraining their choices I hoped to force deliberate choices in their maps and to determine whether there were any common themes in the maps generated. The results indicated that there were two common depictions of the 3 major dialects of American English. I have created two sample maps that represent the overall picture portrayed in each style and listed the percentage of participants that agree with each model.

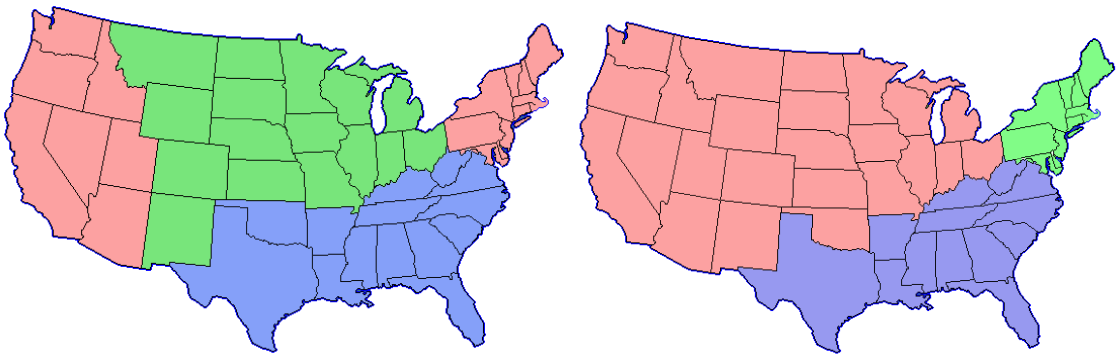


Figure 2- Model 1 (55%) Model 2 (27 %)

These models show two competing conceptions of dialects in America, and Model 1 confirms that people believe the West and the North East to be related dialects as I predicted prior to carrying out the experiment. Model 2 shows a conceptualization that is slightly closer to attested dialect boundaries for the general categories of South, North East and West; however it is the minority and more participants want to group the West together with the North East and show the Midland dialect as distinct. Had I allowed the participants to break the country into 4 categories of English, I speculate that the link between Western and North Eastern speech in the minds of participants would not have been apparent. The restriction to 3 categories was therefore crucial to reveal this relationship.

Furthermore, as you can see from the models above, participants showed very little variation within the category of Southern Speech. In fact, 100% of the participants listed the following states as southern: TX, AL, LA, MI, AR, GA, FL, TN, SC, KT, WV, and VA. The only variations were concerning Okalahoma and Missouri, and were identical everywhere else. States that were grouped as North East 100% of the time were: ME, VT, NH, MA, CT, RI, NY, DE, and NJ. States that were in the Midland and West alternated according to Model 1, Model 2, or some other model, but I did notice certain groups of states in these categories that were always grouped together and never separated. All the following states from the Midland were grouped together: MN, WI, MI, IL, IN, KA, NA, IA, SD, and ND. The Western states were only consistently grouped according to WA, OR, and CA, and all others were variable in the maps of Model 1 and, thus, “fuzzy” in the minds of the participants.

Participants whose maps did not agree with Model 1 or Model 2 showed a few intriguing properties. One participant had grouped the Western and Southern States together extending all the way from Washington, through Texas to Maryland. The Midland region went from the Dakotas south to Kansas and then east to Illinois and Michigan. Another participant had a completely different and original interpretation of the directions and grouped speech according to North, South, and Non-white Speech. The map had a major dialect line dividing North and South running along Arizona, New Mexico and then through Missouri and Kentucky. The Non-white speech dialect was marked in urban areas in the South, as well as the Mid-Atlantic and Southern California. The case of North, South, and Non-white categorization had interesting results in the second phase of the experiment as I did not include any samples of Non-white speech, leading to matching the samples with only 2 of the 3 categories.

4.2 *Sample Category Matching Test*

This test combined the results of the map drawing test with a category matching task with speech samples presented to the subjects. While the first map drawing is a free classification experiment with a constraint on the number of categories, the category matching test becomes a forced choice experiment similar to the ones done by Clopper and Pisoni (2004), but uses categories that were generated organically by the participant before the samples are presented. I designed this experiment and planned out the procedure before I really understood what is was testing, and only as the results of the experiments were analyzed did I realize the significance of the results. The category matching test, determines the degree to which naïve listeners are able to reliably match a dialect with their internal conceptualizations of dialect regions. The test does not asses

the correctness of the dialect regions themselves, but determines only whether listeners are able to associate a dialect with the correct region according to their internal representation. Thus, a participant's map may include the North East and the West grouped together and category matching is considered successful if speech samples from Los Angeles and Boston are grouped together under the schema designed by the participant. This type of test has not been done before in IPS and may show very interesting properties if expanded to a larger scale beyond this pilot experiment, yet already the results seem to illustrate a new picture of dialect perception.

The aggregate success rate for all subjects was 76.67% as shown in Table 1, which is significantly above chance (33.3%). This indicates that subjects regardless of the accuracy of their internal representations as compared to the real world show considerable proficiency matching dialects from multiple regions to their internal representations. Clopper and Pisoni and multiple other researchers have shown that naïve listeners are able to correctly match dialect to region in forced category tests at a rate only moderately above chance. So the question must be asked: why does my pilot experiment seem to contradict this evidence? The explanation seems to be that in my experiment the naïve listeners are not matching a region to a dialect, rather they are matching a mental image of a dialect with markers in the speech

Total		
Sample #	# of Correct Category Matches	% Correct per location
1	6	55
2	8	73
3	10	91
4	8	73
5	10	91
6	4	36
7	6	55
8	3	27
9	11	100
10	11	100
11	9	82
12	6	55
Total # Correct	92	
Total % Correct	76.67	% Correct by Chance (33.33)

Table 1

sample and ignoring region entirely. Part of the difficulty in matching a sample to region for naïve listeners is tha,t in their minds, multiple regions may sound the same, and this may explain the low results found in earlier category matching studies. I speculate that naïve listeners in my experiment are using a different cognitive process to match the samples.

To a participant who has a Map corresponding to Model 1 (equating the west with the north east), a sample from Los Angeles may sound the same as a Connecticut accent. If this is the case the participant recognizes it as a sample that belongs to the category of North East and Western speakers without actually being aware whether the sample is actually from, and achieves a successful matching of the sample to their mental representation regardless of actual region. This process implies that listeners with different mental representations will literally perceive samples differently provided that success rates are approximately equal for all models (I will expand on this in a moment). Therefore, to a subject with a Model 2 Map, the Los Angeles sample ought to be perceived as identical to a Minnesota sample or an Ohio sample, which is not the case for someone with a Model 1 Map.

While many more participants drew Model 1 over Model 2, it was still necessary to compare the success rates of each group, though almost no conclusions can be drawn from the comparison. Participants with Model 1 representations were on average successful 77% of the time matching the sample to their category, while Model 2 participants had a success rate of 55%. Without having a larger testing pool it is nearly impossible to tell whether this contrast would be perpetuated. A discrepancy in success rates would imply that Model 2, as a collection of expectations about regional dialect

markers, did not coincide well with the actual perceived dialect markers, causing more matching failures. This simply means that for less successful mental representations the participants do not hear what they are expecting to hear. This opens up a whole new avenue of research investigating which models, or mental representations, lead to the highest success rate for matching samples to the category.

In terms of general statistics, Table 1 shows that Samples (6) and (8) were the most problematic for listeners to correctly match and were successfully matched only 36% and 27% of the time respectively. Sample (6) was a New York Jewish accent, surprisingly, while (8) was from Los Angeles and both were at or below chance success rates. Samples (9) and (10) were successfully matched 100% of the time and were from Texas and New Hampshire respectively. This was likely because these samples were blatant examples and listeners had less trouble listening for cues. I made some qualitative notes about how long it took people to match the sample to category and the south was by far the fastest, as subjects blurted out their answer after only a couple of seconds. The samples from the north and west were about equal in terms of difficulty. In Table 2 the samples are organized into the attested dialect categories with the success rate of each. It clearly indicates that southern speech was the easiest for the participants to match to their mental representations while samples from the west were most likely to be confused. The range of successful matching among individual participants went from a low at 41.33% up to the high at 91.33%. Both indicate a success rate above chance. The overall indication is that naïve listeners are significantly more proficient at matching dialect samples within their own conceptual

Region	Average % Correct
West	52.5
North	66
Souh	91

Table 2

framework rather than trying to match samples with regions that are at odds with their perceptions.

4.3 *The Descriptor Test*

The descriptor test ran into problems very early on with such a wide variety of terms being used. Most participants could not resist the temptation to describe the speech using a place name like "Boston-like" or "Southern". I eliminated these descriptors as well as all that referred to judgments of personality, like "proper", "educated", "honest", "emotional", etc. Also, I realized halfway through that my usefulness of these naïve descriptors for my intended purpose was reduced because of my experimental design. I had planned to take the descriptors and conjecture as to what attested dialect marker they might correspond, but my experimental design was not collecting descriptors of the attested dialect markers, but instead descriptors of the markers that participants were sensitive to in their own mental representations. I needed to revert to a design where samples would be presented as a group representing the 3 attested dialects, according to sociolinguists, and not according to the internal conceptual framework of each participant. Essentially, since every participant had different results in the category matching experiment, I was getting descriptors of different dialects for each subject. However, the descriptors that were given to me were not particularly useful in their own right either. To the left is table of all the unique descriptors I found and a count of the number of appearances throughout the

Descriptors	Count
Long a's	6
slow	8
enunciated	9
falling tone	1
muffled r	2
hard consonants	3
drawl	5
no pauses	1
garbled	2
hesitant	1
words end in 'uh'	2
no accent	1
over pronunciation	2
flowing	1
choppy	1
bright	1
twangy	5
lolling	2
high pitched	1
sing-song	1

Table 3

experiment. It is clear that of the descriptors elicited, about 5 of them were used enough times to be considered clear and salient descriptors to many speakers. The top five descriptors in order were “enunciated”, “slow”, “long a’s”, “twangy”, and “drawl”. These seemed like the best candidates for conjectures about what they might refer to. However, the situation was complicated once again when I realized that descriptors were being used multiple times by participants to describe different dialect categories. The following table shows the top 5 descriptors and the number of occurrences where it was used multiple times by single participants describing multiple categories. Participants used these descriptors sometimes to describe all 3 dialect categories, thus rendering them virtually meaningless to contrast features between dialect categories. In order to test which descriptors are the most significant a much larger sample will be need and participants must be restricted from using a descriptor more that once. In addition they should be presented with a consistent set of samples that represent the attested dialect groups for, rather than the groups of samples determined by their mental representations, especially since no one was able to correctly match the samples within their framework 100% accurately. Every participant was listening to samples that contained matching mistakes and were not all representative of the major 3 dialects, West, North, and Southern. This part of my experiment I determined to be a failure, though the descriptor terms were interesting. I am hesitant to even make a conjecture about the significance of descriptors like “twangy” and “drawl” because my data shows that these corresponded a few times to

Descriptors used for multiple categories	
slow	5
enunciated	5
long a's	4
twangy	2
garbled	1

Table 4

non-southern categories and were attributed to both Midland and Western speech samples.

5.0 *Conclusions and The Future of IPS*

The process of designing and carrying out this experiment has lead to many surprising failures and results. The realization that my experimental design was yielding results that were in stark contrast to the designs of Clopper and Pisoni (2004) forced me to examine its methodology again, and I realized that it might be exposing aspects that are much more significant than I had thought possible in my experiment. My experiment was intended to culminate in the connection between naïve descriptors and dialect markers, yet the real success was the realization that my category matching technique may be pointing towards new and currently un-described behaviors.

This pilot experiment was only able to indicate that there is some unexplained process behind the categorization of dialects, but created the possibility for numerous variations to develop a deeper understanding of dialect perception. Were I to take this type of experiment to the next level, I would recruit more subjects and investigate the effect that increasing number of categories has on the map drawing as well as the success rates of sample category matching. My hypothesis is that as the number of categories increases that speakers will show a decrease in the success rate of matching samples to categories. A wider variety of samples will need to be presented that fully demonstrate all the variations of English. A second test could be to present the 2 most popular models from the map experiment to naïve participants and then perform category matching tests to determine whether a particular model of the mental representations results in a higher success rate. A corollary to this would be to determine the most popular models for

dialects in the United States with differing constraints on the number of categories. I speculate that Model 1 and Model 2 would be equally popular if the test was given to a larger pool of subjects and with more diverse speech samples that both models would be equally successful for category matching.

Within the larger context of IPS research, my experiment may be able to take a new approach to understanding how people perceive language variation around them. This study has proven to be something of a hybrid between free-classification and forced choice structure that can explore the process of organizing external speech stimuli within internal representations. Other researchers have been moving in this direction, but have not yet synthesized studies eliciting the mental organization of dialects and testing that system with real speech stimuli. The map drawing tasks from Preston (1986) and geographic matching experiments from Clopper (2004) seem to be approaching the same conclusions from different paths, but the combination of both techniques may have revealed new information that was unattainable from either approach. The experimental design clearly bears further exploration with input from both the fields of psycholinguistics and cognitive science to maximize the information that may be drawn out from the results.

The behaviors involved in dialect perception remain slippery and elusive to researchers, yet with the improvement of experimental methods the field of IPS may eventually have a set of concrete explanations and theories about the mental processes behind dialect perception. The experiment outlined in this paper is yet another stepping stone that I hope others may use on the path to understanding the cognitive processes hidden within such a universal experience.

*Acknowledgments

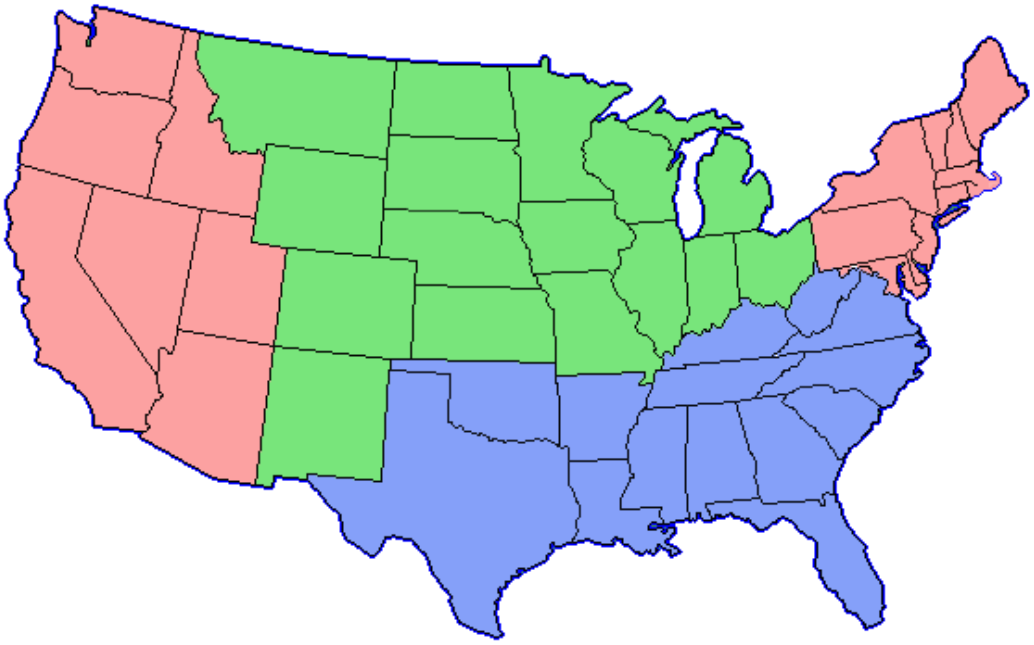
I would like to thank my Faculty advisor David Harrison for all his guidance and enthusiasm in my topic as well as for all his comments during the writing process. In addition I thank my second faculty reader Donna Jo Napoli, my peer readers Nathaniel Peters and Matt Singleton, and all my friends who showed such enthusiasm as participants in my pilot study. I would also like to thank my parents for their assistance as proof-readers and for their encouragement after reading my early drafts.

Appendix A: Sample Questionnaire with Responses

Colin Sullivan
Linguistics Thesis
Fall 2006
Pilot Experiment Questionnaire

Total Number of Subjects: 11
Subject Name: Joe Shmoe

I. The purpose of this study is to investigate the nature of internal mental representations of American English dialects with respect to geography. Please reflect on what you consider to be the 3 major dialects of English and then indicate on the map, using the colored pens, where each dialect is primarily spoken.



II. A series of short speech samples will be played. After listening to each sample please announce to the experimenter which of the 3 major categories of American English specified on the map above is the best fit for the sample. You will hear the sample only once and you may indicate your choice by referring the color corresponding to each dialect on the map.

II. Dialect Sample Matching (Recorded by the Experimenter, Not the Participant

	Sample Grouping		
1. Red	Red	Blue	Green
	1	3	4
2. Red	2	5	12
	6	9	
3. Blue	7	11	
	8		
4. Green	10		

5. Blue

6. Red

7. Red

8. Red

9. Blue

10. Red

11. Blue

12. Green

Notes/Comments:

- Green difficult to describe
- NE and West are together on the map
- Fast Reaction to samples listed as Blue (southern as indicated on the map)
- Expressed desire for 4 colored markers, instead of 3.

III. The experimenter will now play for you again all the samples you indicated belong to each dialect. After listening to the group of samples from the dialect please write down your impressions and descriptions of the qualities of the speech. We are interested in only you initial gut feelings and reactions, and we ask that you limit your responses to single word adjectives or short descriptive phrases. You will perform this task for each dialect category.

Dialect 1 (Red)
- Hard /r/'s
- Enunciated
- Falling tone
- proper

Dialect 2 (Blue)
- Lolling
- Drawl
- Twangy

Dialect 3 (Green)
- Nasal
- Careful Pronunciation
- Slow
- Extended /a/'s

Bibliography

Clopper, C.G. (2004). *Linguistic experience and the perceptual classification of dialect variation.* Doctoral dissertation, Indiana University, Bloomington.

Clopper, C. G., & Pisoni, D. B. (2004). Some acoustic cues for the perceptual categorization of American English regional dialects. *Journal of Phonetics*, *32*, 111-1140.

Clopper, C. G., Conrey, B., Pisoni, D. B. (2005). The Effects of Talker Gender on Dialect Categorization. *Journal of Language and Social Psychology, 24, No. 2,* 182-206.

Evans, B. G & Iverson, P. (2004). Vowel normalization for foreign accent: An investigation of best exemplar locations in northern and southern British English sentences. *Journal of The Acoustical Society of America, 115,* 352-361.

Hill, R. (2001). Production and Perception of authentic and feigned Spanish accent. *Journal of the Acoustical Society of America, 109, No. 5,* 2475.

Krauss, Robert M. and Jennifer S. Pardo. To appear. Speaker perception and social behavior: bridging social psychology and speech science. In Ed., Van Lange, P.A.M., *Bridging Social Psychology: Benefits of Transdisciplinary Approaches*. Mahwah, NJ: Lawrence Erlbaum Associates.

Labov, W., Ash, S., Boberg, C. (2001) *Atlas of North American English*. New York: Mouton de Gruyter.

Labov, W., Karen, M., Miller, C. (1991). "Near Mergers and the Suspension of Phonemic Contrast." *Language variation and change 3*: 33-74.

Markham, D. (1997). *Phonetic Imitation, Accent, and the Learner*. Lund Univeristy Press, Sweden.

Markham, D. (1999). Listeners and disguised voices: The imitation and perception of dialectal accent. *Forensic Linguistics, 6,* 289-299.

Meier, Paul. The International Dialects of English Archive. University of Kansas, Lawrence, Kansas 1997: http://web.ku.edu/idea

Niedzielski, N. (1999). The effect of social information on the perception of sociolinguistic variables. *Journal of the Acoustical Society of America, 19, No. 1,* 62-85.

Plichta, B., & Preston, D. R. (2003) The /ay/s have it: Stereotype, perception, region. Paper presented at New Ways of Analyzing Variation, 32, Philadelphia, PA. October 9-12.

Preston, D. R., ed. (1999). *Handbook of Perceptual Dialectology*. J Benjamins: Philadelphia.

Preston, D. R. (1989). Nonlinguists' views of areal linguistics. *Topics in Sociolinguistics,* 7, xviii, 141. Dordrecht & Providence: Fordence.

Preston, D.R (1986). Five visions of America. *Language in Society, 15,* 221-240.

Purnell, T., Isardi, W., & Baugh, J. (1999). Perceptual and phonetic experiments on American English dialect identification. *Journal of Language and Social Psychology*, *18,* 10-30.

Segerup, M. (1999). Imitation of dialects: from South to West. *Proceedings, FONETIK 99*,121-124. Department of Linguistics, Goteborg University, Sweden.

Thomas, E. R. (2002). Sociophonetic applications of speech perception experiments. *American Speech, 77, No. 2,* 115-147.

Traunmuller, H. (1998). Modulation and demodulation in production, perception, and imitation of speech and bodily gestures. *Proceedings, FONETIK 98,* 40-43. Department of Linguistics, Stockholm University.

Traunmüller, H. (2000) "Evidence for demodulation in speech perception" (Contribution to a workshop on The Nature of Speech Percection and to ICSLP 2000).

Vaissiere, J., de Mareuil, P. B. (2004). *Identifying a language or an accent: from segments to prosody.* Paper presented at the MIDL conference, Paris, November 29-30.

Van Bezooijen, R., & Gooskens, C. (1999) Identification of language varieties: The contribution of different social levels. *Journal of Language and Social Psychology, 18,* 31-48.

Weinberger, Steven. The Speech Accent Archive. George Mason University, Fairfax, Virginia, 2005: http://accent.gmu.edu/