Place-based accentedness ratings don't predict sensitivity to regional features

Abstract: When we ask what linguistic variation language users are aware of, we're typically asking whether and how the sociolinguistic patterns observed in one activity (most commonly linguistic production) are reflected in other activities (most often social perception or explicit verbal commentary). Under the triumvirate presented by Labov (1972), for example, language users are most aware of a variable and its indexical meaning when they verbally report patterns that resemble linguist-documented production patterns and more moderately aware when their social perception patterns do so but their verbal reports do not.

This integration of disparate cross-activity patterns into a single dimension of awareness is largely driven by a flawed cognitive model that presupposes a conscious/unconscious distinction unsupported in current cognitive psychology theories (Evans, 2008). A more effective approach takes a theoretical step back for the moment, asking more basic questions about how analogous sociolinguistic meanings relate across activities. In this paper I do so by asking whether explicit verbal reports and speaker evaluations of accentedness in Ohio, already known to match in terms of content, correlate in strength across individual language users.

1106 participants listened to Ohio talkers reading word lists featuring tokens of either TRAP, DRESS, LOT or GOOSE and rated each talker's accentedness. Subsequently, they rated the accentedness of northwest, northeast, central, southwest, southeast, and rural Ohio and cities in Ohio. Both the place-based task and the speaker evaluation task showed

the expected main effects: southern and rural Ohio were rated as the most accented, followed by northern Ohio, then lastly cities in Ohio and central Ohio as least accented. The verbal guise task showed that each vocalic variable showed an acoustic center, corresponding to the distribution mode, deemed least accented, with ratings increasing with distance from that point. Crucially, however, these two types of effects had no correlation across participants. In other words, those most likely to describe northern Ohio as accented exhibited neither a stronger nor weaker effect of northern features in their speaker evaluation responses.

These results suggest that place-based accentedness beliefs circulate independently of feature-based perceptions. While nonlinguist reports of personal experience serve an important role of marking a register as more limited in circulation, they do not reflect an accurate account of how individual language users develop their attitudinal models. Cognitively, this supports the existing small but so far consistent evidence (Campbell-Kibler, 2012b; Austen, 2020; Campbell-Kibler, 2021) suggesting that indexical relationships are learned and used independently across the systems underlying linguistic activities. For awareness studies, this moves us further from a unidimensional metric towards examining different systems independently.

1 Introduction

The study of awareness and control in sociolinguistic variation has focused on two primary types of task difference: behavior within the same task (e.g. language production) across

theorized differences in attention and behavior across different tasks (e.g. language perception vs. social perception). These two areas of difference have typically been conceptualized as together falling along a single continuum of "less" vs. "more" awareness, with processing of the former assigned to the grammar and of the latter to the sociolinguistic monitor (Labov, 1993).

In [self-reference omitted], I argue that the sociolinguistic monitor is unable to capture the range of sociolinguistic behavior documented in the field and further is unnecessary, as the patterns can instead be captured by sociolinguistically aware conceptualizations of the grammar, the person perception system and self-regulation systems, among other independently motivated cognitive constructs. Under this approach, the key questions concern the relationships between language features and other social structures across activities, without assuming a priori that they can be aligned into a single dimension.

In [self-reference omitted], I took up this question with respect to correlations in the strength of indexical link effects between /s/ and masculinity across three different sociolinguistic tasks (language production, language perception and social perception) and found no such correlations, despite the robust presence of the same language form-social structure link across all three. This lack of effect, along with a similar lack in Campbell-Kibler (2012b) and Austen (2020), suggests that the cognitive representations underlying the indexical effects in each case may be learned and/or stored independently, despite the similarity in their semiotic content.

In the current study I take an analogous approach to social perception and stated

language ideologies, traditionally termed overt and covert language attitudes in the literature. Based on existing work we know that these are often similar in content but need not be (Kristiansen, 2010). What we do not know is whether and to what extent they are learned and stored together. The frequent similarities might indicate that they are, but such work typically focuses on well-established and widespread registers, meaning that such similarity may be caused by mutual reinforcement at the interactional and societal levels, rather than any cognitive connection. Conversely, Kristiansen's documentation of divergence might indicate a lack of connection, but could also plausibly be attributed to social desirability effects. Kristiansen found that participants explicitly reported more positive attitudes to their own region's variety than were reflected in the covert task, making it difficult to rule out regional pride or other desirability as a factor..

To get more directly at the relationship between the two types of task, I do not ask about the social content of the attitudes captured, but rather whether the responses in the overt task correlate with increased feature sensitivity in the covert. Put more concretely, do people who report perceiving an accent in the speech of a given place show greater sensitivity to the individual features common to that place? Answering this question will help us the strength of connection between the two kinds of knowledge. If we do see correlations, they could be due to overlap in the knowledge accessed by the two tasks or to commonalities in the learning process. If we do not, this suggests that the knowledge accessed by the two tasks may be both learned and stored independently.

2 Awareness in sociolinguistic variation

As discussed in the introduction to this special issue, sociolinguistic variation research has been plagued for decades with confusion and vagueness over the term "awareness". This terminological confusion stems from a more profound lack of clarity about the nature of different types cognitive processing and what aspects of that processing underlie different types of sociolinguistic behavior. The importance of awareness in the field stems from one of the original key insights, namely that people exhibit seemingly different sociolinguistic attitudes, associations and preferences depending on the specific behavior being observed. Language users excoriate features that they themselves produce, sometimes while also denying their use of them (Labov, 1966). Situational variation, while often attributable to topic, interlocutor or social goals (e.g. Rickford & McNair-Knox, 1994; Hay, Jannedy & Mendoza-Denton, 1999; Podesva, 2007), also has components that seem tied to mix of processing systems, such as effects of fatigue or intoxication (Labov, 1966). Sharma & McCarthy (2018) have more recently provided direct evidence that attention is an ingredient in situational variation.

Labov (1972, 1993, 2010) has been the primary theorist to spell out the specifics of a model capturing these differences, aligning different types of behavior (and sociolinguistic variables relating to such behaviors) along a continuum of less to more awareness or classifying them as above vs. below the level of consciousness. He proposed two distinct cognitive modules, the grammar on the one hand, which operates below the level of consciousness and the sociolinguistic monitor, which operates above. Such a divide positions

most linguistic processing (such as phonological assimilation) as unconscious or outside of awareness, while most social processing (such as altering language forms in response to changes in social context) are positioned above it. This divide has been challenged by evidence that quite detailed aspects of linguistic processing can be influenced by extralinguistic information such as physical setting (Hay, Podlubny, Drager & McAuliffe, 2017) or perceptions of gender (Strand, 1999). It is also brought into question by evidence from other fields that cognitive processing generally cannot be successfully divided into more vs. less conscious structures (Evans, 2008). With that caution in mind, it does seem to be the case that sociolinguistic behavior (and human behavior generally) is supported by multiple interacting systems with different characteristics (Amodio, 2019), making the modelling task a complex one.

Those interested in awareness in variation are thus left with the challenge of having an intuitively interesting set of questions but lacking effective theoretical structures with which to guide our investigations. In [self-reference omitted] I argue that sociolinguistic-specific structures are unnecessary and that modeling should be behavior-based and draw on independently motivated processes. Our model of language production and perception must capture language users' ability to shift minute and complex features in response to complex social context, including external cues (Hay et al., 2017), pragmatic factors like referents (Hay et al., 1999) and a language user's own immediate (Podesva, 2007, 2011) and long-term goals (Eckert, 2000; Gordon, 2001). It must also capture limitations such as the challenges language users face when confronted with unfamiliar language patterns or

when fatigue or inattention causes them to produce forms counter to their sociolinguistic goals (Labov, 1966; Sharma & McCarthy, 2018). Our model of person perception (Asch, 1946) must capture perceivers' ability to incorporate highly detailed linguistic information (Campbell-Kibler, 2007), including structures unavailable to introspective awareness (De, 2017). It must also capture their inability to access all of the linguistic structures that their grammatical processing is capable of using (Labov, 1993; Austen, 2020). Our model of introspectively available language beliefs must capture their complexity and fluidity, as well as the aspects of other processing they lack access to. And our models of all of these must capture where they do and do not appear to overlap, correlate or depend on the same stored information.

To tackle one aspect of this question, here I ask how place-based accent ratings and speaker evaluation accent ratings are learned and stored. As in [self-reference omitted], my goal is to look for correlations across individuals between two different tasks that might plausibly depend on the same knowledge, or on different knowledge representations learned at the same time. A correlation across tasks would suggest that at least one of these is true, while a lack of correlation would be evidence against both.

We have known for a few decades that "overt" and "covert" language attitudes do not always match in terms of the social content of the evaluations (Kristiansen, 2010), but little more about their relationship. For well-established registers, in Agha's (2007) sense, we typically see convergence. For example, covert attitudes studies of British regional dialects tend to show results coinciding with metalinguistic commentary (Strongman &

Woosley, 1967; Giles, 1971), while the differences so far documented appear to be primarily instances of competing ideological systems clashing (e.g. local pride vs. country-wide semiotics in Kristiansen's results).

I look at three regionally-linked registers with differing levels of circulation (Agha, 2007), namely those associated with southern, northern, and central Ohio. Southern Ohio is widely regarded within the state as part of the south[1] and/or subject to linguistic contamination coming across the Kentucky and West Virginia borders (Campbell-Kibler, 2012a). This link to the strongest regionally defined register in the US (Preston, 1997) makes southern Ohio the most strongly defined "accented" register in Ohio a position that, as we will see in the results below, is still at most moderately accented. Northern Ohio is more controversial, with roughly one third of northern Ohioans and two thirds of central Ohioans marking it as differing in some way from an imagined accent-free norm (Campbell-Kibler & Bauer, 2015). Finally, central Ohio is the area most widely regarded by Ohioans as normative and/or accent-free (Benson, 2005; Campbell-Kibler, 2012a; Campbell-Kibler & Bauer, 2015).

These differences make the varieties ideal for asking whether place-based language beliefs and person perception correlate with one another across perceivers and whether the range of circulation for the register mediates such a correlation. Nonlinguists frequently report limited-circulation registers in terms of personal exposure, relaying that their knowledge of the variety's distinction comes from a friend or a relative from the area, whose dis-

[1]This characterization is not always shared elsewhere in the country, as evidenced by a Texan I once met who, living in the northern Midwest, was startled by an Ohioan expressing delight at meeting "someone else from the South."

tinctive speech alerted them to the traits of the area (Campbell-Kibler, 2012a). Johnstone, Andrus & Danielson (2006) report a similar trajectory in the enregisterment of Pittsburghese as a variety, hypothesizing that young former residents, economically driven out of Pittsburgh, were put in contact with other varieties, causing moments of sociolinguistic noticing that led to the formation of a regionally-linked register. In this model of the process, direct exposure to language variation is a key ingredient in register formation and we would expect the links between places, language features and social qualities to grow together. It is also possible, however, that beliefs about the linguistic qualities of a particular place and the development of linguistic-social linkages in the person perception system proceed independently. In this model, we might imagine that the two types of knowledge circulate separately as independent registers, which may or may not be integrated in the event that they become more widespread.

The current study tests this hypothesis by looking for correlations between the two types of knowledge across perceivers. If we find one, that suggests that either the place-linked beliefs and the person perception patterns are learned together, that they depend on the same knowledge or both. If not, it suggests that, at least for limited-circulation registers, the two types of knowledge can spread and be learned independently.

3 Ohio Dialectology and Perceptual Dialectology

Ohio is positioned centrally across several major dialect boundaries. The northern parts of the state are typically grouped with other Great Lakes areas (Carver, 1987; Linn, 1990;

Davis & Houck, 1995) in a region I'll follow Labov, Ash & Boberg (2006) (hereafter ANAE) in calling the Inland North. The central areas fall into ANAE's Midland. The large linguistic differences between the Midland and Inland North are well documented, including the persistence of a relatively abrupt geographic boundary at what once was the southern border of the western reserve (Thomas, 2010). The extent of encroachment of the south into Ohio is a matter of disagreement, with ANAE including only the barest corner of the state in their South isogloss while Flanigan (2000, 2005) argues that southern features extend well into the state.

The perceptual dialectological landscape of Ohio is quite different from the linguistically documented one, however. Nonlinguists are more confident about the prevalence of southern features within the state, conceptualizing southerness as a contagious element spread through contact with states to the south (Campbell-Kibler, 2012a). Ohio's geographic position and history prompt conflict with this observation for some, leading to commentary on the incongruity or inappropriateness of the presence of southern features in the state (Campbell-Kibler & Torelli, 2013).

Conversely, the Inland North vs. Midland boundary, so clear to linguists, is only variably recognized by others. Campbell-Kibler & Bauer (2015) found that roughly a third of Ohioans reported perceiving no difference between the speech of central and northern Ohio. Among those who did report a difference, the central Ohioans unanimously characterized the north as the marked variety, though most of them were reluctant to classify it as accented, preferring to characterize northerners in more idiosyncratic terms as hav-

ing quirks or mannerisms. Northern Ohioans themselves were even more reluctant to label their speech as accented, with half those marking a difference between northern and central Ohio casting central Ohio as the divergent speech type rather than the north and some including the area within the southern accent.

In order to test the relationship between language beliefs and person perception, five place descriptions and five language features were identified. While previous work on Ohio perceptions showed a primary three way split between north, central and south, some participants indicated distinctions between the northwest and northeast or the southwest and southeast. In addition, many indicated that rural and urban Ohio were distinct from elsewhere (Campbell-Kibler, 2012a). Accordingly, the place-based evaluations asked for accent ratings of northeast Ohio, northwest Ohio, central Ohio, southeast Ohio, southwest Ohio, rural Ohio and cities in Ohio.

Speaker evaluation stimuli representing the Inland North/Midland boundary were prepared that varied in fronting of the LOT[2] vowel, in the fronting and raising and/or diphthongization of TRAP/BATH and the backing and/or lowering of DRESS. These are three elements considered typical of the Northern Cities Shift, one of the key markers of the Inland North. Of them, TRAP/BATH in particular has been observed to attract the highest levels of metalinguistic commentary within the state (Campbell-Kibler, 2012a; Campbell-Kibler & Bauer, 2015) and elsewhere, even to the point of triggering retraction of the feature through time (D'Onofrio & Benheim, 2020; Nesbitt, 2018, 2021). Of the three, then, we might most expect a correlation between sensitivity to this feature and

[2]The word classes developed by Wells (1982) will be used throughout.

perceptions of the north. GOOSE fronting is also included, as a feature that has sometimes been documented as differing between the two varieties, with ANAE noting that "a few sections of the north (p. 133)" are the only holdouts resisting the widespread phenomenon.

It has been proposed however, that GOOSE fronting has different types, prominently differentiated by degree of diphthongization. Accordingly, a diphthong measure of the GOOSE tokens was also included as a potential correlate with southern perceptions. Second, the distance between pre-nasal and non-pre-nasal DRESS was calculated for each DRESS stimulus, as a way to capture reactions to the *pin/pen* merger.

4 Methods

4.1 Stimuli

One methodological goal of this study was to explore the usefulness of large-scale stimuli pools for verbal guise studies. Verbal guise studies (Pear, 1931) are traditionally carried out with very small numbers of talkers, risking confounds stemming from perceptions of the talkers themselves over the varieties they are intended to represent (Lee, 1971; Levon, Sharma, Watt, Cardoso & Ye, 2021). Typically these dangers have been addressed through the use of matched guise studies, but these present their own challenges in ensuring control and they also typically use small numbers of language producers per guise. The current study takes a different approach, using a very large corpus of read speech to construct a verbal guise experiment on large numbers of stimuli.

Stimuli were taken from a separate project collecting recorded speech data from students at Ohio State University (Wanjema, Carmichael, Walker & Campbell-Kibler, 2013). This project yielded recorded speech of many students reading a limited set of word lists, in recordings of highly variable quality. From this corpus, speakers were selected who fit the criteria of female, white, between the ages of 18 and 25 and having lived the years between 6 and 17 in the same town within Ohio and whose recordings were clear and noise free. The age, gender and race limitations are due to seeking homogeneity in these respects and selecting the population that were best represented in the corpus.

For these speakers, all of the word list tokens from their recordings were selected for the vowel classes TRAP, DRESS, LOT and GOOSE, each extracted into a distinct stimulus for each talker. Each stimulus consisted of a single talker saying between two and seven words featuring the same stressed vowel. Most but not all of the words featured were monosyllabic. Appendix 8 lists the words represented in the stimuli for each vowel class. Because these were based on availability in a corpus built for other reasons, they are not well balanced, and the data will provide little insight into linguistic constraints on the perception of accent in these variables.

4.2 Procedure

Data for this study were collected at the Language Pod, a linguistics lab embedded in the science museum COSI, in downtown Columbus. Museum visitors were approached and asked if they were willing to participate in a research study about accents. Those that

agreed were taken into the lab and seated as a group in a small conference room around a table. All people present were offered a response sheet, including children below the age of nine. During the consent process, in addition to the standard required information, participants were told that they could withdraw their consent for research at the end of the session by destroying their response sheet or taking it away with them. Only response sheets left at the end of the session from participants nine years of age or above were included in the study.

Participants were then told that they would hear a series of recordings, each featuring a speaker saying several words, all with the same vowel in them. Response sheets featured 15 lines, labeled "Not at all accented" to "Very accented". Participants were asked to make a mark on each line corresponding indicating how accented they perceived the correspondingspeaker to be. After rating all 15 speakers, participants were asked to turn their response sheets over. The reverse side had demographic questions and the perceptual dialectology task, shown in Figure 1. Participants were asked for their age, gender, racial/ethnic identification, their regional history and whether they had been speaking English since prior to five years of age. The perceptual dialectology task presented participants with seven place descriptions: central Ohio, northeast Ohio, northwest Ohio, southeast Ohio, southwest Ohio, cities in Ohio and rural Ohio. The rating task for the place names and for the speaker evaluations were designed to be as similar as possible.

2012B0213 **(KC071013)**

How old are you? _____

Are you: _____male _____female _____both/neither

Where have you lived? (City, State, ages)

What race(s) or ethnicit(y/ies) do you identify with?

Have you been speaking English since you were less than 5 years old?

____Yes ___No

Based on your impressions, how accented, generally speaking, is the speech in each of the following areas?

Not at all accented Very accented

central Ohio

northeast Ohio

northwest Ohio

southeast Ohio

southwest Ohio

cities in Ohio

rural Ohio

Figure 1: Second page of response sheet, demographics and place-based ratings

4.3 Participants

Out of 17,475 trials, 5.2% of the data were excluded: trials were excluded for all participants in the session due to technical problems playing the sound file, children needing attention, or adults distracting other participants, while participants were excluded if they had learned English after the age of 5, had self-reported hearing loss, or appeared to be heavily intoxicated during the session, in all cases due to a concern that they might systematically differ from other participants on both tasks, thereby introducing a confounding correlation.

This left 16,560 trials from 1106 participants, with a mean age of 25.5 and standard deviation of 14.3 years. Of these, 632 were female, 469 were male, 4 identified as neither and 1 did not indicate their gender. 842 self-identified as white, 68 as multiracial, 37 as Black, 21 as Asian, 9 as Latino, 3 as Middle Eastern and one as Native American. 125 declined to give their racial/ethnic identification or misunderstood the question.[3] Regional classifications were made in three distinct systems, based on residential history in Ohio,in the Inland North and in the South.

4.4 Analysis

Response sheets were analyzed using a user-driven computer vision script written in Python, while demographic information was entered by hand. Place-based ratings approximated normal distributions and were analyzed untransformed. Participant regional history was

[3]A number of participants appeared to interpret our phrasing to ask what races or ethnicities they were not prejudiced against, offering responses that they got along with everyone.

tested as a potential predictor, using linear regression models and testing only the relevant predictor for the area (e.g. experience living in northern Ohio as a predictor for ratings of northern Ohio). Gender and age were tested as predictors for all ratings.

The speaker evaluation ratings for each vowel class were heavily right skewed, so the scale, originally 0-100, was divided by 100 then logit transformed to better approximate a normal distribution. A linear mixed effects regression model was fit to the transformed values.

One model was fit to the entire speaker evaluation data set, testing age, gender, regional background and perceptual dialectology responses as overall predictors to the speaker evaluation ratings. Then the evaluation data were divided into responses to each vowel class and each acoustic characteristic was tested as a potential predictor of accentedness along with the relevant regional background and perceptual dialectology response and the interaction between the acoustic feature and each of these. In addition to the typical linear predictor, the square of the acoustic measure was tested for inclusion in the model, in order to capture the possibility that a particular point or range of the production was seen as less accented, with ratings increasing in both directions from there. As with the place-based ratings, participant regional background was tested, but only the background relevant to the specific acoustic feature examined.

5 Results

5.1 Region perceptions

The ratings for each named region are given in Figure 2 and the correlations across the places are given in Table 1. Place categories were grouped into three categories: cities in

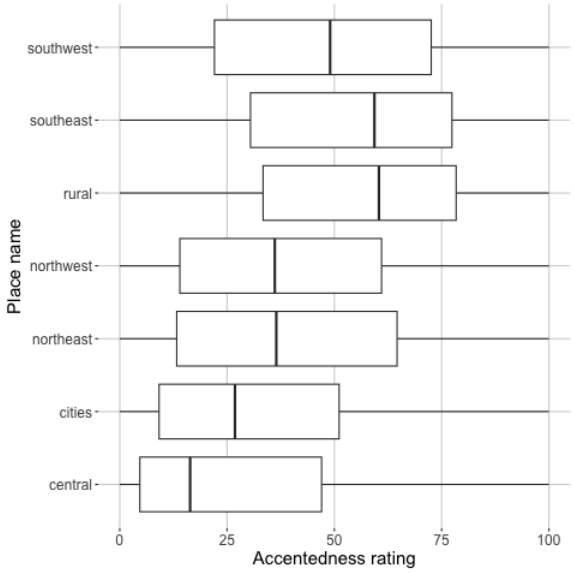

Figure 2: Accented ratings for named Ohio places.

	northwest	southeast	southwest	rural	cities	central
northeast	**0.57**	0.29	0.17	0.28	0.30	0.30
northwest		0.26	0.28	0.28	0.37	0.30
southeast			**0.60**	**0.46**	0.29	0.20
southwest				**0.36**	0.31	0.23
rural					0.22	0.20
cities						**0.46**

Table 1: Accented ratings for named Ohio places.

Ohio and central Ohio, northeast and northwest Ohio, and southeast, southwest and rural Ohio. Each of the three combined ratings were modeled testing listener age, how much

they lived in Ohio, a lifelong metric for living in the relevant dialect area and a childhood-specific metric for the relevant dialect area within Ohio. Thus for northern ratings, the predictors were age, childhood residence in northern Ohio (none, any, all) and lifetime residence in the Inland North (none, Ohio only, non-Ohio only, both). The childhood residence metric for southern Ohio distinguished those who had only lived in Cincinnati from those living elsewhere in southern Ohio. For central Ohio, only a childhood metric was tested, as no Midland residence history was calculated, as it was not clear which varieties to include for the current purposes.

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	42.8242	1.2601	33.99	0.0000
any childhood in north OH	-25.6573	14.6043	-1.76	0.0796
all childhood in north OH	-12.1798	3.0099	-4.05	0.0001

Table 2: Linear model for accented ratings of northern Ohio

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	52.6644	1.2505	42.12	0.0000
any childhood in south OH	16.4240	8.3560	1.97	0.0499
all childhood in south OH	0.2455	2.5540	0.10	0.9235
childhood in Cincinnati	-14.2576	4.2473	-3.36	0.0009
never lived in Ohio	11.1691	11.0102	1.01	0.3109
lived in Ohio and elsewhere	8.3139	3.3229	2.50	0.0127
lived internationally	-9.2209	8.9987	-1.02	0.3060

Table 3: Linear model for accented ratings of southern and rural Ohio

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	28.9143	0.7501	38.55	0.0000

Table 4: Linear model for accented ratings of central and urban Ohio

These analyses indicated that regional history, particularly from childhood, does influence perceptual dialectology. Those who spent their whole childhood in northern Ohio

gave the area lower accentedness ratings than others. Conversely, spending some (but not all) of one's childhood in southern Ohio lead to greater accentedness ratings for the area, as compared to those who never lived there during childhood. When including adult regional history, those who lived in and out of Ohio giving higher accentedness ratings to southern Ohio, as compared to those who lived all of their lives in the state. No regional or demographic factors influenced perceptions of central Ohio.

In additional to the pre-planned models, a post-hoc set of models tested learning effects. During the descriptive phase of analysis, the data suggested that children, adolescents and even young adults did not distinguish the regions as much as adults, as shown in Figure 3. Accordingly, we fit models to only data from participants under 25 years of

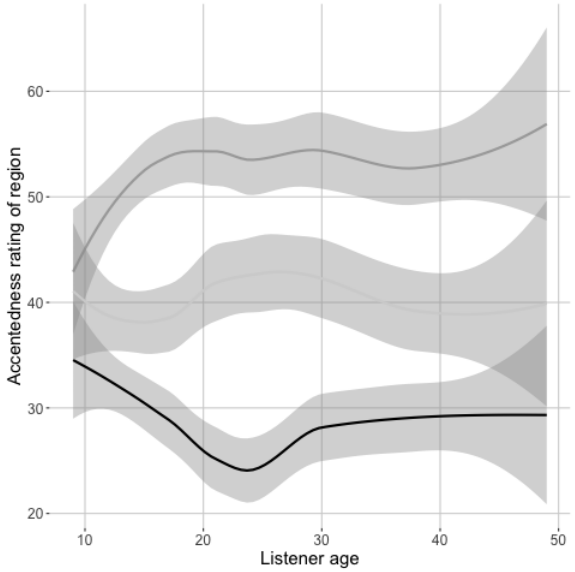

Figure 3: Accented ratings for named Ohio places.

age, re-testing age along with whichever predictors had proved significant in the original models. Ratings of northern Ohio showed no effect of age ($\beta = 0.17$; $p = 0.528$), but those

for the central and cities assessment and the southern and rural rating showed significant effects, in the directions indicated in Figure 3: children learn to view central Ohio as less accented and southern Ohio as more accented as they grow (β = -0.81; $p < 0.001$ and β = 0.64; $p = 0.011$ respectively).

5.2 Speaker evaluation

The overall model tested regional background and perceptual dialectology as predictors for all the speaker evaluation stimuli across vowel class. It showed lower accentedness ratings from participants who have lived in the Inland North in and out of Ohio and higher ratings from those who spent some but not all of their childhood in southern Ohio. It also showed stronger correlations with all perceptual dialectology ratings, meaning that people who gave higher ratings for the place-based assessments also tended to give higher ratings in the speaker evaluations, regardless of place or feature.

	Estimate	Std. Error	df	t value	p value
Intercept	-0.93	0.07	252.39	-14.38	< 0.001
Region: lived in OH & non-OH north	-1.42	0.69	425.47	-2.05	0.041
Region: lived in OH north	-0.13	0.09	440.46	-1.41	0.161
Region: lived in non-OH north	0.35	0.32	442.56	1.09	0.274
Childhood: some in south OH	0.62	0.29	433.53	2.15	0.032
Childhood: all in south OH	-0.09	0.09	445.49	-1.08	0.281
Childhood: Cincinnati	-0.13	0.15	449.41	-0.86	0.389
Trial number	0.03	0.00	6143.25	7.22	< 0.001
north OH rating	0.11	0.04	457.90	2.76	0.006
south & rural OH rating	0.17	0.04	431.68	4.54	< 0.001
cities & central OH rating	0.18	0.04	432.96	4.75	< 0.001

Table 5: Fixed effects of accented ratings of all stimuli

For the individual word classes, the selected acoustic feature was measured for each

vowel token in the words read and the mean value was taken. For some word classes, multiple values were measured. The acoustic features were as follows: LOT: F2 at the point of highest intensity; TRAP: F2 - F1 at the point of highest intensity and Euclidean distance between the 20% and 80% F1 and F2 measurements; DRESS F2 - F1 at the point of highest intensity and Euclidean distance between the F1 and F2 means of the pre-nasal and non-pre-nasal tokens.

For each acoustic feature, a model was fit to the listener's speaker evaluation rating of stimuli of that word class, with the key predictor an interaction between the listener's rating of the corresponding perceptual dialectology dimension and the acoustic feature selected for the analysis. Either the linear or the quadratic predictor for the acoustic feature was tested in this interaction, based on which of the two proved significant as a main effect. Along with that key test, for the benefit of model fit, we also tested for inclusion the listener's age, gender and relevant regional history.

Overall, the selected acoustic feature typically showed an effect on the accented ratings either as a linear or quadratic predictor. Likewise, the perceptual dialectology ratings often though not always showed a main effect correlating with the speaker evaluation, such that, for example someone who rated northern Ohio more accented as a place also gave generally higher accent ratings to all the people they heard. However, in most of the models there was no support for an interaction between the two. One exception is in the GOOSE data, where those giving low accent ratings for northern Ohio are sensitive to GOOSE fronting as an accented feature, while those giving higher ratings are not.

This interaction does not take the predicted form, where those offering a higher rating for a region show more sensitivity to the features of that region. Instead, it is something of a converse: those giving low ratings for the region show more sensitivity to a feature more advanced in another region, though also variably found in that region. This effect does not offer clear support for a close relationship between covert and overt attitudes, but is worth noting as a divergent point from the lack of effects elsewhere.

	Estimate	Std. Error	df	t value	p value
Intercept	-1.17	0.13	299.59	-9.29	< 0.001
meanF2^2	0.11	0.05	89.88	2.35	0.021
Trial number	0.03	0.01	1276.03	2.70	0.007

Table 6: Fixed effects of accented ratings of LOT *stimuli*

	Estimate	Std. Error	df	t value	p value
Intercept	-0.77	0.14	335.67	-5.55	< 0.001
Age	-0.01	0.00	205.82	-3.49	0.001
Region: lived out of OH	0.55	0.15	207.08	3.56	< 0.001
Region: lived in & out of OH	-0.03	0.15	203.57	-0.18	0.86
Trial number	0.03	0.01	2843.73	4.60	< 0.001
north OH rating	0.25	0.05	204.97	4.66	< 0.001
mean F2-F1	0.20	0.05	156.80	4.11	< 0.001
(mean F2-F1)^2	0.11	0.03	152.11	3.42	0.001
mean diphthong length	0.17	0.05	154.09	3.64	< 0.001

Table 7: Fixed effects of accented ratings of TRAP *stimuli*

	Estimate	Std. Error	df	t value	p value
Intercept	-1.11	0.08	465.35	-14.08	< 0.001
Trial number	0.03	0.01	3905.97	6.59	< 0.001
north OH rating	0.22	0.04	274.20	4.76	< 0.001
(mean F2-F1)^2	0.07	0.02	159.16	3.16	0.002
pin/pen distance	0.21	0.07	146.79	2.97	0.004
pin/pen distance^2	-0.05	0.02	148.77	-2.08	0.04

Table 8: Fixed effects of accented ratings of DRESS *stimuli*

	Estimate	Std. Error	df	t value	p value
Intercept	-0.90	0.12	317.04	-7.17	< 0.001
Region: lived in OH & non-OH north	-1.33	0.81	118.50	-1.65	0.101
Region: lived in OH north	-0.48	0.20	122.80	-2.36	0.02
Region: lived in non-OH north	0.37	0.41	120.70	0.90	0.369
Trial number	0.04	0.01	1741.80	4.77	< 0.001
north OH rating	0.24	0.07	129.20	3.21	0.002
mean F2	-0.10	0.11	7.14	-0.96	0.37
Childhood: some in south OH	1.23	0.48	121.24	2.59	0.011
Childhood: all in south OH	-0.40	0.21	122.44	-1.92	0.057
Childhood: Cincinnati	0.46	0.33	130.46	1.42	0.157
north OH rating x mean F2	0.12	0.04	95.50	2.81	0.006

Table 9: Fixed effects of accented ratings of GOOSE *stimuli*

Figures 4 to 7 show the effects of each acoustic measure on speaker evaluations, with the perceptual dialectology patterns of the participants indicated by color and line type. While the models treated this predictor continuously, for ease of presentation they are indicated in the graphs with a simple high vs low divided on the median.

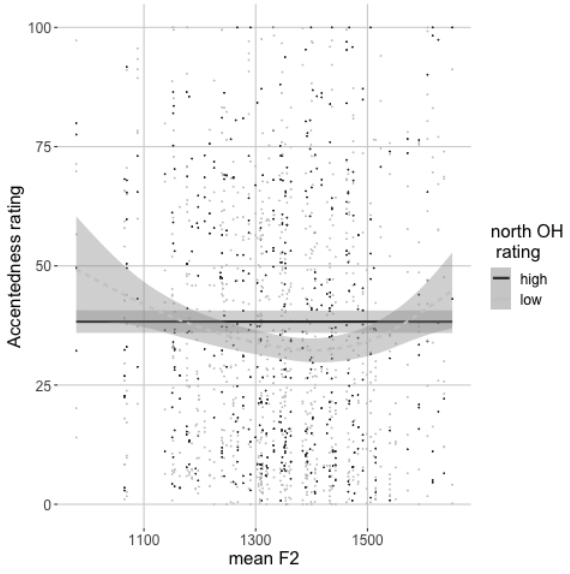

Figure 4: Accented ratings for LOT *stimuli.*

Apart from this central result, a handful of other predictors showed significant re-

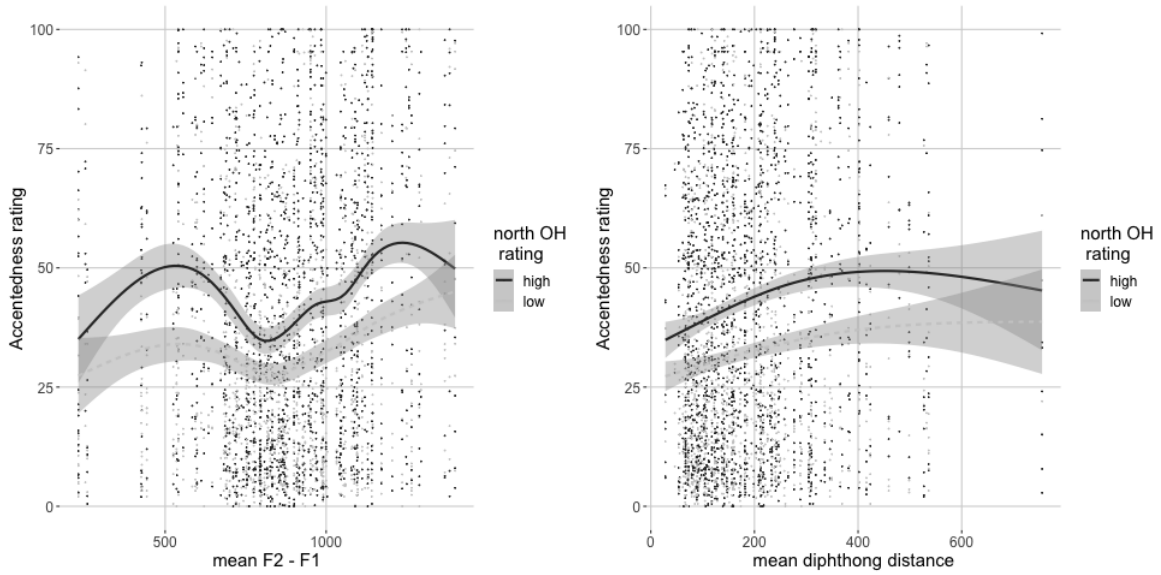

Figure 5: Accented ratings for TRAP *stimuli.*

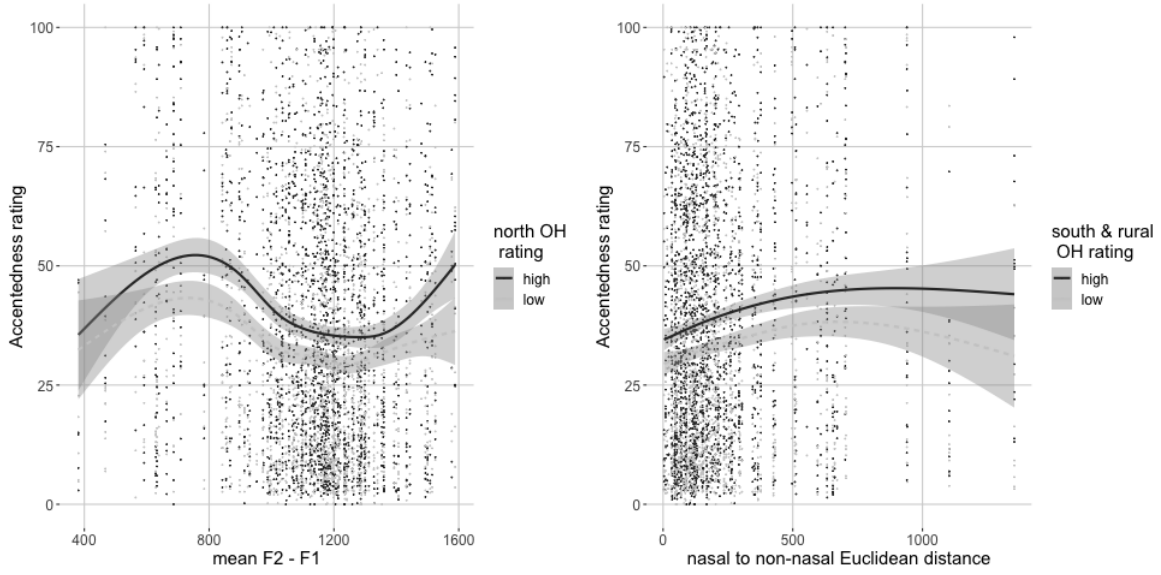

Figure 6: Accented ratings for DRESS *stimuli.*

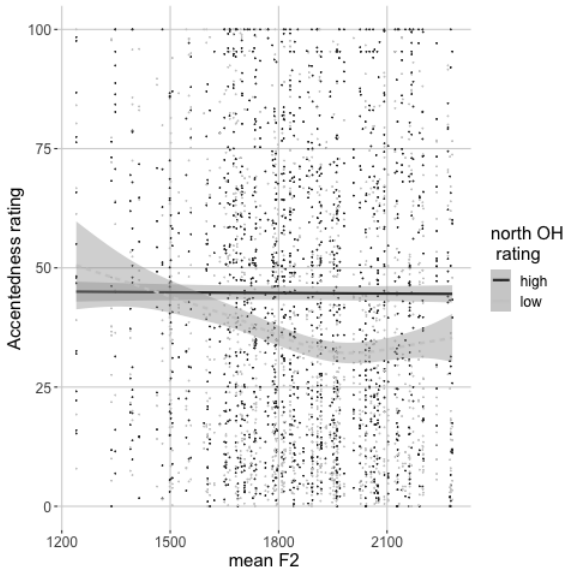

Figure 7: Accented ratings for GOOSE *stimuli.*

sults. Trial number consistently showed that accent ratings increased over the course of the experiment. This likely reflects participants' adjusted expectations as they acclimatize to the stimulus pool. Comments after the task indicated that, starting a study on accents, many participants expected voices they perceived as "really accented", i.e. those associated with more widely circulated and heavily marked registers. Our Ohio talkers were perceived as the unaccented options but received higher ratings as it became clear that no other varieties were forthcoming. As in the case of the perceptual dialectology predictors, however, this was a main effect only and did not trigger increased sensitivity to the acoustic features.

Regional background emerged in only three instances. In ratings of the TRAP stimuli, non-Ohioans gave higher ratings than those who lived some or all of their lives within the state. In the GOOSE data, those who lived in northern Ohio gave higher ratings than those

living elsewhere in the Inland North and those never living in the Inland North. Also in GOOSE data, those who lived some but not all of their childhood in southern Ohio gave higher ratings than those who lived none or all of their lives in the region. All of these are main effects, not mediating the effect of the acoustic feature, suggesting that they are likely to be spurious effects stemming from participant differences across the vowel class data sets, rather than true effects, which would more likely apply across all the data rather than being specific to the task of listening to a single vowel class.

6 Discussion

Taking the descriptive findings first, the results support the scant existing literature on perceptual dialectology in Ohio, suggesting a broad three-way division into north, central and south, with rural areas aligned conceptually with the south. In this data, cities are aligned with the less marked central region, which is somewhat different from that found in Campbell-Kibler (2012a). This divergence is likely due to differences in the task, since the rating task here does not easily allow for the kind of coded race discourse documented in that study.

The place rating data also indicates that Ohioans take until adulthood to fully absorb the perceptual dialectology beliefs of their communities. By 9 years of age, they show some differentiation between perceptions of the north and the south, but both curves take until roughly 20 before they level out. In the speaker evaluations, however, age has no impact on the perception of acoustic features.

The speaker evaluation results suggest that all acoustic features investigated are attended to, at least to some degree. Each feature shows a particular point at which accentedness ratings are lowest, with relatively smooth increases as productions move away from that point. For the two distance measures, TRAP/BATH diphthong length and *pen*/DRESS distance, the least accented productions are the low points. For the rest, the least accented point corresponds to the mode of the stimulus distribution. To test whether this effect was a result of adaptation to the stimulus set, the models described above were re-fit with an additional term testing an interaction between the significant acoustic feature and trial number. None of the interactions were significant and a visual inspection confirmed that the low-accent points for data based only on the first three trials for each participants were similar to those for the whole data set. This suggest that the correspondence between the stimulus distributions and the accentedness ratings are based on perceptions built outside the experimental setting.

A visual inspection of the curves for the central and northern Ohioans suggest that the latter may have "least accented" points for each feature that trend further in the direction found commonly in the north. No significant differences are seen in the models, however. It must be noted that marking the forms one hears most frequently as straightforwardly the least accented reflects a substantial level of linguistic security. A similar study with a population whose own language use is perceived as accented or otherwise marked by others would almost certainly yield different and illuminating patterns.

The key result of interest is, of course, the lack of mediation of the place ratings on

the relationship between the acoustic features and the speaker evaluation ratings. Other work, such as Hadado's in this issue, has found that beliefs about specific places is a crucial mediator in sociolinguistic perceptions, with the perceiver's regional identification essentially determining the social characteristics attributed to the language user.

We looked for this potential interaction with the understanding that, particularly in the case of disputed northern Ohio, such an interaction would illuminate the process by which language users are inducted into the circulation of a register. One model, espoused by the participants in Campbell-Kibler (2012a) as well as some linguists (e.g. Kleinschmidt & Jaeger, 2015), is that people observe variation in the linguistic world around them and when they notice differences between someone's language use and their own or those of their closest interlocutors, they mentally note that difference, tagged with some social information. Under this approach, perceptual dialectology isoglosses are essentially reinvented by many individuals until, perhaps some minimum threshold establishes them as widespread. Agha's (2007) account places a much heavier emphasis on metalinguistic activities, particularly broad-scale communications like books and other media. Under this account it is possible, even likely, to develop a social sense of a particular place or type of person having a notable way of speaking with no specific features at all, or only one or two that have been remarked on, as with Uriah Heep's missing h's (Agha, 2007). If the communications occur in print, or without any actual users of the variety present, the register may be spread with no linguistic exposure whatsoever.

Apart from the learning process, another potential source of correlation is the mental

representations individuals maintain of registers. If all of the elements of a register (e.g. linguistic features, person types, characterological figures, social characteristics) are mentally retained as a unit, we might expect some individuals to have a stronger representation than others (they are "more aware" of the variety), leading to larger effects across tasks. We might also predict that the association a given individual has between the register and the concept of accentedness would be linked to the entire representation. Both effects would predict correlations between explicit rating and speaker evaluation tasks. The results instead present a more scattered picture, as found elsewhere Campbell-Kibler (2012b); Austen (2020); Campbell-Kibler (2021). The associations with accentedness for both features and places are present and consistent with those found through other types of tasks. They just appear to live somewhat independent lives.

7 Conclusion

The results presented suggest that even for registers of limited circulation, learning to talk about the language in a given place and developing social associations with specific features occur independently. This contradicts the self-reported paths of learning found in Campbell-Kibler (2012a), in which participants would link their knowledge of the register to personal observation of a known user, e.g. "I had a teacher from Cleveland and she was, she definitely had a northern accent. (p. 299)" Such explanations are markers of the limited circulation of the register and perhaps serve a further purpose of mitigating the social consequences which attend the assignment of "accent" to a place or a group of people.

They are not, however, accurate descriptions of the register learning process at a broad scale.

This study adds to the small but growing body of evidence that different sociolinguistic behaviors depend on their own independently learned associations rather than a generally available representation. While it makes sense to refer to indexical links broadly when referring to communities or other similarly large scale arenas of meaning, when considering the cognitive level, we must be more specific. What grows to a stable system of meaning at the community level is at the cognitive level constructed of small, largely uncorrelated pieces.

When considering the notions of awareness and control, then, these findings push us further away from a unidimensional model of "more" vs. "less" awareness. In the most basic sense, questions of awareness and control in sociolinguistics are asking how the relationships between linguistic structures and other social structures changes as we shift the lens of observation over different contexts and activities. If language users form these relationships independently, it is not merely a question of which of the different cognitive systems do or don't "know" about a given indexical link, as is implied by a model built on levels of awareness. Rather, different systems can know entirely different things about a given linguistic form. While this appears to be unusual in practice, it is by no means undocumented, as in Kristiansen's work already noted above and in McGowan & Babel (2020), and discussed in Babel's contribution to the current issue. At the same time, these different dimensions inform and interact with each other, as we see in Stecker & D'Onofrio's

paper in the current issue.

Somewhat paradoxically, then, my suggestion for the study of awareness and control is for us to move away from the concepts or at least to ruthlessly question what we mean by them. When attending to the limited senses of introspective awareness and deliberative control, we can ask meaningful and interesting questions about how sociolinguistic behaviors interact with the boundaries of introspection. Given that we don't have a full model of what introspective awareness is or how it fits into a broad model of human cognition, however, we want to be cautious in our conclusions. Beyond this narrow sense, however, I think we are better served framing questions in more specific terms based on the contexts and language activities of interest.

References

Agha, Asif. 2007. *Language and social relations*. Cambridge: Cambridge University Press.

Amodio, David M. 2019. Social cognition 2.0: An interactive memory systems account. *Trends in Cognitive Sciences* 23(1). 21–33.

Asch, Solomon E.. 1946. Forming impressions of personality. *Journal of Abnormal and Social Psychology* 41. 258–290.

Austen, Martha. 2020. Production and perception of the pin-pen merger. *Journal of Linguistic Geography* 8(2). 115–126.

Benson, Erica J.. 2005. Folk perceptions of dialects in Ohio. In Brian D. Joseph, Carol G. Preston, & Dennis R. Preston (Eds.), *Language diversity in Michigan and Ohio: Towards two state linguistic profiles*, 35–60. Ann Arbor, Michigan: Caravan Books.

Campbell-Kibler, Kathryn. 2007. Accent, (ING), and the social logic of listener perceptions. *American Speech* 82(1). 32–64.

Campbell-Kibler, Kathryn. 2012a. Contestation and enregisterment in Ohio's imagined dialects. *Journal of English Linguistics* 40(3). 281–305.

Campbell-Kibler, Kathryn. 2012b. The Implicit Association Test and sociolinguistic meaning. *Lingua* 122(7). 753–763.

Campbell-Kibler, Kathryn. 2021. The cognitive structure behind indexicality: Correlations in tasks linking /s/ and masculinity. In Lauren Hall-Lew, Emma Moore, & Robert J. Podesva (Eds.), *Social meaning and linguistic variation: Theorizing the third wave*. Cambridge University Press.

Campbell-Kibler, Kathryn & M. Kathryn Bauer. 2015. Resisting enregisterment: Perceptual dialectology of northern Ohio. *Journal of English Linguistics* 43(2). 95–117.

Campbell-Kibler, Kathryn & Amber Torelli. 2013. 'Bitch, I'm from Cleveland, you have the accent': Tracking enregisterment on Twitter. Paper presented at American Dialect Society annual meeting in Boston, MA.

Carver, Craig M.. 1987. *American regional dialects: A word geography*. Ann Arbor, Michigan: University of Michigan Press.

Davis, Lawrence M. & Charles L. Houck. 1995. What determines a dialect area? Evidence from the Linguistic Atlas of the Upper Midwest. *American Speech* 70(4). 371–386.

De, Zachary. 2017. Race, gender, and /u/: Social perceptions of a non-stereotype feature. The Ohio State University Master's thesis.

D'Onofrio, Annette & Jaime Benheim. 2020. Contextualizing reversal: Local dynamics of the Northern Cities Shift in a Chicago community. *Journal of Sociolinguistics* 24(4). 469–491.

Eckert, Penelope. 2000. *Linguistic variation as social practice: The linguistic construction of identity in Belten High.* New York: Blackwell.

Evans, Jonathan St. B. T.. 2008. Dual-processing accounts of reasoning, judgment, and social cognition. *Annual Review of Psychology* 59. 255–278.

Flanigan, Beverly Olson. 2000. Mapping the Ohio valley: South Midland, lower North or Appalachian? *American Speech* 77(4). 344–347.

Flanigan, Beverly Olson. 2005. Mapping Ohio: Dialect boundaries revisited. In Brian D. Joseph, Carol G. Preston, & Dennis R. Preston (Eds.), *Language diversity in Michigan and Ohio: Towards two state linguistic profiles*, 1–24. Ann Arbor, Michigan: Caravan Books.

Giles, Howard. 1971. Patterns of evaluation to R.P., South Welsh and Somerset accented speech. *British Journal of Social and Clinical Psychology* 10. 280–281.

Gordon, Matthew. 2001. *Small-town values, big-city vowels: A study of the Northern Cities Shift in Michigan*. Duke University Press.

Hay, Jennifer, Stefanie Jannedy, & Norma Mendoza-Denton. 1999. Oprah and /ay/: Lexical frequency, referee design, and style. In *Proceedings of the 14th International Congress of Phonetic Sciences* 1389–1392. Berkeley, CA. University of California.

Hay, Jennifer, Ryan Podlubny, Katie Drager, & Megan McAuliffe. 2017. Car-talk: Location-specific speech production and perception. *Journal of Phonetics* 65. 94–109.

Johnstone, Barbara, Jennifer Andrus, & Andrew E. Danielson. 2006. Mobility, indexicality, and the enregisterment of "Pittsburghese". *Journal of English Linguistics* 34(2). 77–104.

Kleinschmidt, Dave F & T Florian Jaeger. 2015. Robust speech perception: recognize the familiar, generalize to the similar, and adapt to the novel. *Psychological review* 122(2). 148.

Kristiansen, Tore. 2010. Conscious and subconscious attitudes towards English influence in the Nordic countries: Evidence for two levels of language ideology. *International Journal of the Sociology of Language* 204. 59–95.

Labov, William. 1966. *The social stratification of English in New York City*. Washington, DC: Center For Applied Linguistics.

Labov, William. 1972. *Sociolinguistic patterns*. Philadelphia: University of Pennsylvania Press.

Labov, William. 1993. The unobservability of structure and its linguistic consequences. Paper presented at NWAV 22, University of Ottawa.

Labov, William. 2010. *Principles of linguistic change, volume iii, cognitive and cultural factors*. Wiley-Blackwell.

Labov, William, Sharon Ash, & Charles Boberg. 2006. *The Atlas of North American English: Phonetics, phonology and sound change*. Berlin: Mouton de Gruyter.

Lee, Richard R.. 1971. Dialect perception: A critical review and re-evaluation. *Quarterly Journal of Speech* 57. 410–417.

Levon, Erez, Devyani Sharma, Dominic J. L. Watt, Amanda Cardoso, & Yang Ye. 2021. Accent bias and perceptions of professional competence in England. *Journal of English Linguistics* 49(4). 355–388.

Linn, Michael D.. 1990. A reanalysis of the dialect boundaries of the Linguistic Atlas of the Upper Midwest. *Journal of English Linguistics* 23. 47–62.

McGowan, Kevin B & Anna M Babel. 2020. Perceiving isn't believing: Divergence in levels of sociolinguistic awareness. *Language in Society* 49(2). 231–256.

Nesbitt, Monica. 2018. Economic change and the decline of raised TRAP in Lansing, MI. *University of Pennsylvania Working Papers in Linguistics* 24(2).

Nesbitt, Monica. 2021. From an indicator to a marker. In Arne Ziegler, Stefanie Edler, & Georg Oberdorfer (Eds.), *Urban matters: Current approaches in variationist sociolinguistics* volume 27, 159–177. John Benjamins Publishing Company.

Pear, T. H.. 1931. *Voice and personality*. London: Chapman and Hall.

Podesva, Robert J.. 2007. Phonation type as a stylistic variable: The use of falsetto in constructing a persona. *Journal of Sociolinguistics* 11(4). 478–504.

Podesva, Robert J.. 2011. The California vowel shift and gay identity. *American Speech* 86(1). 32–51.

Preston, Dennis R.. 1997. The South: The touchstone. In Cynthia Bernstein, Thomas Nunnally, & Robin Sabino (Eds.), *Language variety in the South revisited*, 311–351. Tuscaloosa: University of Alabama Press.

Rickford, John R. & Faye McNair-Knox. 1994. Addressee- and topic-influenced style shift: A quantitative sociolinguistic study. In David Biber & Edward Finegan (Eds.), *Sociolinguistic perspectives on register*, 235–276. Oxford: Oxford University Press.

Sharma, Devyani & Kathleen McCarthy. 2018. Attentional load and style control. *University of Pennsylvania Working Papers in Linguistics* 24(2). 15.

Strand, Elizabeth A.. 1999. Uncovering the roles of gender stereotypes in speech perception. *Journal of Language and Social Psychology* 18(1). 86–99.

Strongman, Kenneth T. & Janet Woosley. 1967. Stereotyped reactions to regional accents. *British Journal of Social and Clinical Psychology* 6. 164–167.

Thomas, Erik R.. 2010. A longitudinal analysis of the durability of the Northern-Midland dialect boundary in Ohio. *American Speech* 85(4). 375–430.

Wanjema, Shontael, Katie Carmichael, Abby Walker, & Kathryn Campbell-Kibler. 2013. The Ohiospeaks project: Engaging undergraduates in sociolinguistic research. *American Speech,* 88(2).

Wells, John C.. 1982. *Accents of English* volume 1. Cambridge University Press.

8 Stimulus words

TRAP AUTOMATIC DRAGON MALLORY PACK PAST BACK FLAT MAD SATURDAY BAD BAG FAST HAD SASH HAPPILY HAT PASS TAG

GOOSE DUDE DUKE MOON SHOES FOOD WHO'D THROUGH TWO HOOT TOOTH LOOSE PROOF

LOT CON COT DON ROD HOT ON

DRESS AMERICAN BEST FRIEND PENNY RED STRETCH BED DEPTH MEDICINE PEN BENCH HEAD CENTURY DRESSES EXPERIMENTAL HEAVEN MELANIE TELEPHONE EVERY PEG PET TEN TEST SECONDS