Urban/suburban contact as stylized social practice

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Abstract

This study highlights the importance of urban/suburban contact to linguistic variation. I explore two case studies of intra-metropolitan contact and their effect on variation in the English of Greater St. Louis, USA. Data comes from 14 white women born 1971–1991 from outer-ring suburbs in St. Charles County who differ in their length of commute, and twelve white women born 1935–1952 from the City of St. Louis who differ in whether they moved to suburbs in adulthood. The results suggest that in contact situations, the city and suburb accommodate to one another: commuting towards the city yields more ‘city-like’ speech, while moving away from the city yields more ‘suburb-like’ speech. However, identity mediates these contact situations through stylized social practice.

Keywords: suburbs, contact, migration, commuting, social practice, Northern Cities Shift, St. Louis

1 Introduction

One of the complicating factors when studying linguistic variation in metropolitan areas (globally, I would submit, although perhaps most clearly in the United States) is that suburbs and the central city are in a complex relationship, as they have economic and cultural ties, yet are also socially and politically fragmented.

Many sociolinguistic studies treat the metropolitan area in one of two ways which privilege one or the other of these aspects: a small town wholly separate from the city (Gordon 2001; Johnson 2007; Olivo 2013) or as part of the city itself (Wikle and Bailey 1997; Thomas 1997; Driscoll and Lape 2015). Each approach has its merits. For example, urban theorists like Brenner (2002) consider cities and their suburbs to constitute an urban agglomeration, which offers support to the treatment of the metropolitan area as a single unit. At the same time, because the regions are so fragmented, approaches which treat suburbs and the central city as separate communities are also justified. Recent work that combines these approaches has in fact shown that patterns of linguistic variation in metropolitan areas can involve effects of both political fragmentation and regional cohesion (Duncan 2019).

Each of these approaches share the key assumption that residents of a space are largely similar. That is, after accounting for differences in social class, sex/gender, etc., speakers from a given space will share linguistic features and/or constraints. A growing body of work suggests that this assumption,

and space and place more generally, should be problematized (Horvath and Horvath 2001, 2002; Johnstone 2004; Britain 2010, 2013). Britain's (2010) core critique of how space has been treated in variationist sociolinguistics illustrates why this is the case. According to Britain (ibid.), much of the literature either ignores space entirely, or considers only locations and the distance between them. In their studies of /l/ vocalization in Australia and New Zealand, Horvath and Horvath (2001, 2002) make the convincing claim that considering the distance between locations is not enough for studies of linguistic variation, but that studies must rather consider effects of *place* as well.

While he uses slightly different terminology, Britain (2013) similarly considers distance to be but one of the three faces of *spatiality*: Euclidean space, social space, and perceived space. Euclidean space is 'objective' space that deals in locations and the distance between them. Social space is space as shaped by humans – the built environment, how the state organizes and controls it, and the like. Perceived space is how individuals and civil society construct perceptions and attitudes of space, as well as how these attitudes and perceptions are shaped by space. These latter two types of space fit into what Horvath and Horvath (2002) consider to be place. While these aspects of space can be separated from one another, they are inherently tied together in the construction of spatiality.

The role of perceived space in constructing place suggests that it is not simply where a speaker grew up in a metropolitan area that influences how

they speak, but how they interact with the area and the people within it. Accordingly, the aim of this paper is to consider the influence of one aspect of speakers' lifestyles on linguistic variation within a metropolitan area. Using Greater St. Louis, Missouri¹, USA, as a case study, I examine how differing degrees of contact between urbanites and suburbanites correlates with variation. I operationalize this in two ways: speakers who grew up in the city and subsequently moved (or did not move) to the suburbs as adults, and speakers who grew up in suburbs and commute (or do not commute) towards the city for work. I will show two key results from this. Firstly, there are bidirectional contact effects arising from urban/suburban contact. Secondly, quantitative measures of speaker identity correlate with whether speakers enter into contact situations or not.

I argue that, although entering into a contact situation – moving to the suburbs or obtaining a job near the city – is largely market- and policy-driven, there is an element of choice involved for individuals as well. This desire-driven element of entering into contact situations means that contact arises through a form of social practice which is available to be stylized. I suggest that the correlation between contact and the quantitative measures of identity illustrate that speakers are doing exactly that. By stylizing their social

¹ Greater St. Louis includes parts of both Missouri and Illinois. I have situated the region in Missouri here because all of the data discussed in this paper comes from the Missouri side of the metropolitan area.

practice, speakers throughout the region enter into contact with one another to varying degrees, which carries linguistic consequences.

2 Contact and identity in metropolitan areas

Metropolitan areas are complex systems, and as such speakers within them have a multitude of ways to come into contact with each other. In this paper, I focus on two of these ways: residence and employment. These were chosen because they both largely represent one-way population flows, making contact within the region of these types rather easier to understand. That said, not every speaker within a metropolitan area participates in these population flows, which means that otherwise comparable populations may differ with respect to the degree of contact that members have with other speakers. In this section, I explore the role of residence and employment further and consider a potential role for identity in metropolitan contact.

2.1 Migration to suburbs

Suburbanization in the United States began in the mid-to-late 19th century, as upper middle class residents of cities in the industrial Northeast moved out of the city to chase a rural ideal (Muller 1976). Early suburbs were quite expensive, and it took advancements in housing construction and public

transit to make suburbs more affordable and open them up to the lower middle class. Access again widened, beginning in the 1930s, as the Federal Housing Administration and Home Owner Loan Corporation subsidized the building of suburban housing units. This trend accelerated in the postwar era, as the G.I. Bill made this subsidizing available to all white servicemen returning from World War II (Jackson 1985). Housing subsidies were primarily limited to white Americans, meaning that American suburbs were constructed white as a matter of public policy (see, for example, Abrams 1955). Suburban development has thus been marked by market- and policy-driven limits on access from the beginning, as racial and economic factors play a role in determining who can move to suburbs.

Although migration to suburbs occurred from all over the United States, much of the migration is from the city to the suburbs (Jackson 1985). This effectively meant that, while many American cities (and in fact the most densely populated neighborhoods in almost all American cities) lost population in the postwar era (see Lichter and Brown 2011 for recent data), the metropolitan areas typically did not lose population because the urban population loss remained in the region. This means that suburbs pose an instance of intra-metropolitan area contact: urban migrants come into contact with the formerly rural or older suburban residents (not to mention the migrants from elsewhere in the United States) as a suburb develops.

However, while large-scale population loss in American metropolitan areas is well-documented, the fact remains that not every urban resident left

the city for the suburbs. Some of this is a matter of the aforementioned limits placed on access by racial housing discrimination and economic factors. For example, working class African Americans typically remained in the city as middle class whites moved out during the postwar era. For these urban residents, moving may never have been a realistic option (although Nicolaides and Wiese (2006) note that access has increased in recent decades). There were, however, white middle class residents who had the ability to move to the suburbs but did not. These residents are comparable to their peers who grew up in the city and left. By virtue of not leaving, however, they come into far less contact with ex-rural speakers and other suburban migrants. Older speakers who left/did not leave the city in the postwar era thus represent a group with differing degrees of contact.

2.2 Commuting to cities

Historically, the commercial and industrial centers of the metropolitan area remained in the central city, even as middle class residents migrated to the suburbs (Jackson 1985). As such, these residents typically were employed in the central city and commuted to work. For this reason, Jackson (*ibid.*) considers a long travel-to-work time to be a key feature of American suburbs. Commuting thus represents another contact site; suburban commuters interact with other commuters as well as urban locals while at work. For this reason,

in fact, Buchstaller and Alvanides (2013) use travel-to-work areas to delineate sampling regions for dialectological fieldwork in the North East of England.

Recent decades have seen industry, retail, and other key parts of the local economy move to the suburbs (Teaford 1997). This decentralization is reflected in current demographic trends in the United States; while there was net migration into metropolitan areas in 2008–2009, the urban core had a net loss of population (Lichter and Brown 2011). In such metropolitan areas, suburbanites have little need to visit the central city, as they can live, work, and shop in the suburbs. In such cases the central city usually maintains cultural significance, although cultural institutions are beginning to move to the suburbs as well. Those suburbanites who do work in the suburbs thus do not have contact with urban speakers to the same degree that commuters do. Because decentralization has meant that not every suburban worker commutes to the central city anymore, younger suburban residents are another group in which speakers differ in their degree of contact.

2.3 A role for identity?

The development of suburbs accompanied a cultural shift in the United States. In particular, the rise of the importance of the nuclear family and personal privacy has been linked to suburbanization (Jackson 1985). At the same time, the subsidization of built housing has encouraged a high degree of homeownership. Due to this policy-backed encouragement, the American

Dream of homeownership and middle class status became synonymous with an aspiration to a suburban lifestyle (Jackson 1985; Nicolaides and Wiese 2006; inter alia).

As a result of this synonymy, many in academia and the public alike adopt what Berger (1961) calls the *myth of suburbia*. The myth concerns who lives in the suburbs – the white middle class – and how they live – a nuclear family in a home they own. This myth carries specific claims about ‘the suburban lifestyle’, as though there is a single one. These claims include a high degree of religiosity and commonplace interactions between neighbors. Furthermore, the myth claims that ownership of any particular home is temporary, as upward mobility will enable the purchase of a better one (Berger 1961).

The ideology underlying the myth of suburbia means that much of suburban identity is marked in opposition to the urban (Fishman 2006). This opposition is often rooted in fear of the urban, as Low (2001) notes. This urban fear is racialized; black neighborhoods in the central city are often seen as representing the whole of the urban space (Teaford 1997). Because suburban identity is often constructed in opposition to urbanness, Hummon’s (1986) study of two California suburbs finds that relatively few residents of either positively identify as suburban, while most construct their place-based identity with respect to urban and rural environments. Those that do identify as suburban, however, root their identity in the myth of suburbia, relying on positive imagery such as their concern for family and home life.

The myth of suburbia and its associated imagery is the predominant view of suburban spaces, and can be seen as a form of *habitus* (Bourdieu 2010): a discourse of values embodied and reproduced by individuals. Because this discourse of suburbs as white and middle class and the values associated with this group is so embedded within American culture, individuals often take positions on suburbs (and the city) in reference to the discourse.

Even so, we should take interest in how individual speakers take positions on suburbs and the city, both in social and linguistic practice. By social practice, I mean how speakers position suburbs, the central city, and themselves in the moral geography of the metropolitan area (following Modan 2007) through day-to-day activity, interaction, and the like. Following Eckert's (2008) discussion of stylistic practice, I use linguistic practice to mean how speakers draw upon linguistic features to index aspects of their identity.

There is good evidence that speakers may engage in linguistic stylistic practice to index place-based identity. Fridland (2012: 187) posits that the urban/rural divide plays out linguistically in the Southern Vowel Shift, by which there is an "ecological distinction" between rural and urban speakers in their maintenance of shifted front vowels. In his study of Hancock County, Tennessee, Reed (2016) finds this ecological distinction reproduced within the rural population. Speakers who display higher degrees of 'rootedness', who are tied to the community and have a great deal of local pride, also have higher rates of PRICE monophthongization and rising pitch accents than less

rooted speakers. Our question, then, is in part whether place-based stylistic practice, like that found to distinguish urban and rural areas, is also used to distinguish urban/suburban speakers within a metropolitan area.

3 Greater St. Louis

I situate this exploration with a case study in Greater St. Louis for social and linguistic reasons. Socially, the region is prototypical of American metropolitan areas and thus a good field site. Linguistically, there are urban phonological features that make the local white dialect distinct from white dialects in the surrounding region. As such, it is reasonably straightforward to test for contact and identity effects in the St. Louis area.

3.1 Background

St. Louis was a large industrial city during the 19th and early 20th centuries, and as such saw both early suburban development and the more widespread pattern of postwar suburbanization. The postwar pattern in particular resulted in the loss of approximately 60% of the city's population since 1950, most of which remained in Greater St. Louis (see, for example, discussion in Williams 1973). This loss was primarily white flight due both to policy and racial animus; subsidized housing through the G.I. Bill enabled white families to

leave the city, and animus toward the prospect of neighborhood integration encouraged many to do so (see Gordon 2008 for further discussion). As seen in fig. 1, suburban development in Greater St. Louis has resulted in a heavily suburban region. The City of St. Louis itself is the small teardrop in the center, while the remainder of the map shows suburban and exurban counties. The relatively densely populated region in the middle forms the core urbanized space of the metropolitan area.

Fig. 1: Population density in Greater St. Louis (ACS 2017, prepared by Social Explorer)

Sprawl, population loss in the City of St. Louis, and the concentration of wealth in suburban areas have resulted in the metropolitan area decentralizing in addition to suburbanizing. The suburb of Clayton is widely regarded as the first *edge city* (to use the term coined in Garreau 1991), or suburb with a

business district unconnected to that of the central city, in the United States (Kersten and Ross 1968; Teaford 1997), and much of the industry in the metropolitan area is located in suburbs.

This decentralization, in conjunction with the large suburban population, enables many to avoid the city itself if they so desire. This means that there are some suburban residents who not only live, but work, shop, and seek entertainment entirely in the periphery, while other suburban residents work and/or shop and/or seek entertainment in the central city. Table 1 provides a partial illustration of this: the majority of workers in the City of St. Louis, St. Louis County (immediately west of the city), and St. Charles County (30 miles west of the city) have relatively short commutes (zero–29 minutes), which indicates that they work close to home. Other workers do have longer commutes (30+ minutes); note that St. Charles County has the largest percentage of such workers. Where the region is not decentralized, we would expect to find a starker contrast between locations, with far longer commutes in St. Charles County compared to the City of St. Louis. Instead, St. Charles County has large populations of both commuters and those working near home.

Tab. 1: Travel-to-work times in three Greater St. Louis counties (ACS 2016, prepared by Social Explorer)

	Travel-to-Work Time			
	Less than 10 minutes	10–29 minutes	30–59 minutes	60 minutes or more
St. Louis City	8.69%	58.81%	26.11%	6.39%
St. Louis County	9.26%	56.18%	30.24%	4.32%
St. Charles County	8.83%	52.63%	34.78%	3.76%

These factors of widespread suburbanization and decentralization suggest that Greater St. Louis is a strong candidate for a case study of language and contact within a metropolitan area.

3.2 Linguistic features

Greater St. Louis has several traditional linguistic features that differ from the surrounding region. The city historically merged the START and NORTH vowels, and is stereotyped as doing so today despite apparent time retreat to the general North American English merger of NORTH and FORCE (Murray 2002). Duncan (2018a) finds that this retreat is operationalized by raising NORTH, and that among speakers old enough to have the traditional merger, it is far more prevalent in the city than suburbs, making the feature particularly urban.

The St. Louis area also participates in the Northern Cities Shift (NCS), which includes the raising, fronting, and diphthongization of TRAP; fronting

of LOT; lowering of THOUGHT; and backing of DRESS (Goodheart 2004; Labov, Ash and Boberg 2006). Duncan (2019) finds that LOT-fronting progressed throughout Greater St. Louis during a similar timeframe, but that TRAP-raising only spread to suburbs via relocation diffusion (cf. Johnson 2007) after suburban development began. In other cities with the NCS, the TRAP and LOT vowels in particular are stigmatized and in retreat (cf. Wagner et al. 2016 for Lansing, MI, and Driscoll and Lape 2015 for Syracuse, NY). Greater St. Louis shows this pattern as well; both LOT and TRAP are in retreat, with TRAP undergoing phonological reorganization to the nasal system common to North American Englishes, in which a raised and fronted allophone is present in pre-nasal contexts (Duncan 2019). Duncan (ibid.) additionally shows that St. Louis' suburbs are leading these retreats.

We thus have three vowels—, NORTH, TRAP and LOT— for which speakers in the city and suburbs appear to have different patterns and which may be stereotyped or show evidence of social evaluation. These vowels are ideal variables, then, for exploring potential contact effects in Greater St. Louis. In the analysis that follows, I therefore examine F1 of NORTH, F2 of LOT, and F1 of TRAP (focusing on the raising element of the vowel).

It is worth considering what the variants mean, and what we expect to see. Although the entire region is retreating from use of the traditional low NORTH vowel (merged with START) and NCS TRAP and LOT, because the suburbs lead retreat (Duncan 2019), we can view the traditional features as more 'city-like' and the outcomes of retreat (nasal TRAP system, backed LOT, raised NORTH)

as more ‘suburb-like’. Essentially, while the whole of Greater St. Louis is retreating from traditional features, the City of St. Louis appears to be most conservative in this respect, and we will thus be treating conservative speakers as ‘city-like’. In this regard, contact effects would be a function of interaction with more or less conservative speakers. We would expect older speakers who migrated to suburbs to be less ‘city-like’ in production than those who remained because they are in contact with less conservative speakers. At the same time, we would expect younger suburban speakers who commute toward the city for work to be more ‘city-like’ in production than those who do not commute because they are in contact with more conservative speakers.

4 Methods

Data for this study is drawn from Duncan’s (2018) study of 52 white middle class women in Greater St. Louis (out of a larger sample of 94 speakers from the region). Of these 52 women, two subsamples (26 speakers total) were taken, with the aim of creating a natural experiment to test the effects of residence and employment. Although the subsamples cover different age groups, this is not a problem because the subsamples will not be quantitatively compared to each other. For this reason, the subsamples were selected to

capture a demographic profile appropriate for the period in which contact would have occurred.

The first sample is used to test the effect of residence. It consists of twelve speakers who grew up in the urban environment of South St. Louis. All of these speakers are older, born between 1935 and 1952. As such, they had the opportunity to either leave the city (six speakers) or remain (six speakers) in adulthood. The second sample is used to test the effect of employment. It consists of 14 speakers who grew up in suburban St. Charles County. St. Charles County only saw suburban development begin in earnest after 1970, and as such this is a younger sample, with all speakers born between 1971 and 1991. Of these speakers, five commute toward the city for work, while nine work locally in St. Charles County.² I say ‘toward the city’ because none in fact work in the City of St. Louis itself; however, all five work in St. Louis County, which is closer to the city than St. Charles County. They all thus commute toward the center, which is different from living and working in the periphery as their peers do. Figure 2 shows the location of both sampling sites within Greater St. Louis.

Both of these subsamples admittedly represent a simplification of the dynamics under discussion. Although I am using employment and residency

² One speaker I count as a commuter is a housewife, but she and her husband moved to St. Louis County. Because of where she lives, she, like the commuters who still reside in St. Charles County, is in contact with speakers in St. Louis County. As such, she best fits into this group. One speaker I count as a non-commuter has quite a long commute, but works in suburban Jefferson County, which is south of St. Louis County. She is thus a speaker on the periphery who commutes to elsewhere on the periphery, which I view as different from commuting toward the center.

as a proxy for degree of contact, there is of course variability in individuals' experiences of these factors. This variability in experience means that not every speaker will have the exact same amount of contact that others categorized in the same way will. For example, one commuter may socialize with urban colleagues and have close ties to the city as a result, while another may have quite weak ties with their (suburban) colleagues on the whole. Overall though, I believe it is accurate to claim that on average, suburban speakers who work near the city will have more contact with urban speakers than those who work in the periphery, and urban speakers who moved to the suburbs will have more contact on average with suburban speakers than those who remained in the city.

At the same time, it is quite possible for these factors to be collinear with other potentially relevant factors. For example, Duncan (2020) examines the same set of older speakers with respect to the type of secondary education institution they attended, and notes that the analysis is complicated by the fact that the distribution of speakers who attended Catholic high schools as opposed to public high schools is nearly identical to the distribution of speakers who remained in the city as opposed to moving. Whether this collinearity is meaningful in and of itself or simply a coincidental result of a small sample is beyond the scope of this chapter, but we should certainly recall this when interpreting the results of the following analysis. Although these issues of simplification and collinearity should be taken into account and any further exploration should problematize the factors further, I believe

the factors as operationalized will be informative as a first pass at understanding the effects of different forms of contact within a metropolitan area.

Fig. 2: Location of urban and suburban sampling sites

4.1 Interviews

All speakers participated in a classic sociolinguistic interview (see Becker 2013 for discussion); the data I consider here is from the informal conversation portion of the interview. Interviews were recorded using either a Zoom H4 Handy recorder (nine recordings), a Zoom H5 Handy recorder (one recording), or the H5 recorder and Shure SM93 omnidirectional lavalier microphone (16 recordings). This variability in recording equipment will not

affect the analysis of vowel formants. Regardless of the equipment used, interviews were recorded as .wav files using a 16 bit, 44.1 kHz sampling rate.

Fifteen minutes of each interview were transcribed by an undergraduate research assistant. Transcriptions were forced-aligned using the FAVE³ program, and a Praat⁴ script was used to extract vowel formant measurements in 10% intervals. Data was normalized using the Lobanov (1971) method and normalized values were rescaled to Hz using the means of overall speaker means and overall speaker standard deviations. Because the TRAP vowel is often diphthongized, I use the measurement at 20% of the vowel duration to ensure that I measure the nucleus. I use the measurement at 40% of the vowel for LOT and NORTH. I use linear mixed effects regression in R⁵ (Bates et al. 2015) to analyze the production data. Speaker and lexical item were random effects, while residence/employment and phonological factors known to influence the production of the vowels under study in Greater St. Louis (Duncan 2018, 2019) were included as fixed effects.

4.2 Questionnaire

³ FAVE (Forced Alignment and Vowel Extraction) is an automatic vowel formant extraction software(10.5281/zenodo.22281).

⁴ Praat is a computer program with which you can analyse, synthesize, and manipulate speech, and create high-quality pictures. The version used here is version 6.0.28 from 2017. (<http://www.praat.org/>).

⁵ R is a free software environment for statistical computing and graphics (<https://www.r-project.org>).

To assess speakers' orientation to place and potential effects of this on linguistic practice, this study relies on a questionnaire in conjunction with production data from the conversation portion of the sociolinguistic interview. The questionnaire was designed to elicit evaluations of suburbs and cities for various attributes under the reasoning that one's evaluation of place is part of (but certainly not the entirety of) one's place-based identity. Participants were provided with a list of potential attributes and asked to circle those that describe cities or suburbs. These attributes were collected in part from scales used in matched-guise studies by Bauman (2013) and Lambert et al. (1960) and were supplemented with others that one often finds are used to describe places in popular and news media (e.g., *safe/dangerous*, *quiet/loud*, *cultured*). In total, 40 attributes were collected in a randomized two-column list.

The circling task was the final part of the sociolinguistic interview. After the semi-structured conversation and elicitation of careful speech, participants filled out a questionnaire that asked where they travel within the area and what kinds of activities they participate in.

Next, they were handed the list of 40 attributes and asked to circle all of the words that describe "big cities". If clarification was sought, I explained that they were to describe cities of a comparable size to or larger than the City of St. Louis. I explicitly did not specify a maximum or minimum number of attributes to be circled. After participants finished with this list and returned it to me, I handed them a re-randomized list of the same 40 attributes and

asked them to circle all of the words that describe “suburbs like those around St. Louis”. When clarification was sought, I suggested that if they had an idea of suburbs in general, they could describe those. Again, I did not specify a minimum or maximum number of circles to be made.

To determine which attributes tend to be circled together, I use principal component analysis (PCA) in R on the data. This analysis is a statistical method for transforming possibly correlated variables (in our case, different attributes) into new orthogonal principal components. There are as many components as variables in the original data set, but the components are not correlated. The variance is computed for each component. This value represents how much of the variability in the data is explained by variation in the value of the component. This is comparable to the r^2 value of a linear regression model, which represents how much of the variability in the dependent variable is explained by variability in the independent variables.

In our case, the variance of a component reflects how much of the variability of the entire data set is explained by variability in the value of the component. By rotating these components, we can see the loading of each variable, or how well the variable correlates with the component. The sign of the loading indicates positive or negative correlation, while the magnitude of the loading indicates the degree to which the variable is correlated with the component. While a component includes influences of each variable in the data set, the loading is often taken to indicate which variables most influence the value of the component. For a given component, we are thus able to use

these measures to see how much of the variability in the data is explained by the component (the variance) and which of our original factors are strongly correlated with it (the loading).

Both PCA and its relative, factor analysis, have been used in linguistics to reduce a long list of attributes to a smaller number of factors in analyzing evaluation tasks (Grondelaers and van Hout 2010; *inter alia*). In these approaches, the variables with the highest magnitude loadings for a given component can be viewed as mutually constituting a factor. For example, if a data set has 25 variables, PCA will create 25 components, of which three may have a high variance and thus explain a great deal of variability in the data set. These three components can then be interpreted as factors constituted by variables with a high-magnitude loading. Linguistic studies that rely on PCA therefore require two cut-off points in order to summarize the data. One cut-off is the variance of components; only those components with a higher variance than the cut-off are kept. Another cut-off is the loading of variables; only loadings whose magnitudes exceed the cut-off are selected as contributing to the component.

This process allows researchers to find a handful of factors that represent bundles of variables. The researcher can then interpret the meaning of each factor by looking for commonalities between the variables selected for the factor. Often, the factors are given a name in prose to signify what the researcher perceives as commonalities between the correlated variables.

In our case, the data is the list of 80 attributes (40 for cities and 40 for suburbs). The responses for all 94 interviewees who completed the task were converted into binary variables by coding a circled attribute as 1, and a non-circled attribute as 0. Here, PCA was run two times: once on the attributes describing cities alone (a data set of 40 variables), and once on the attributes describing suburbs alone (a data set of 40 variables).

In each case, principal components were kept if they had a variance above 0.05, that is, if the variability in the value of the component explained at least 5% of variability in the data set. Rotated variable loadings were kept if the magnitude of the loading was above 0.25. Because there are a great many variables and the variables are binary, loadings appear to be lower overall than in other studies. As such, the loadings with a magnitude of .25 represent a high degree of correlation with the component in comparison to other variables. The accepted components and the variables they encompass were then transformed into scales representing selected factors. The responses of individual speakers were then used to obtain a score for each factor. I treat these scores and their underlying scales as social factors that we can correlate with linguistic data.

5 Results

Each of the three variables analyzed shows an effect of degree of contact. Overall, contact effects are bidirectional; we find evidence of suburban commuters adopting ‘city-like’ productions and urban migrants adopting suburb-like productions. However, each variable only shows an effect for one sample under study. We also find that our quantitative measures of place identity correlate with whether speakers enter into contact situations.

5.1 Production

Residence is correlated with both NORTH and LOT production. For each of these vowels, I use speakers who remained in the city as a baseline when conducting linear mixed effects regression. With respect to NORTH, the baseline production is fairly low ($\beta = 706.104$, $p < 0.0001$). Duncan (2018) had found in a larger sample of speakers that the vowel is higher with an onset preceding the vowel. We find that this effect remains in the smaller sample of speakers ($\beta = -64.096$, $p = 0.0244$). The effect of residence is that the vowel is higher among speakers who moved to the suburbs later in life than those who remained in the city ($\beta = -57.284$, $p = 0.0413$, cf. fig. 3).

Fig. 3: NORTH production in South St. Louis

LOT behaves similarly to NORTH. The baseline production by speakers who remained in the city is fronted ($\beta = 1475.141$, $p < 0.0001$). Duncan (2019) found an effect of the environment following the vowel; the effect is repeated in the smaller sample. The vowel is backer when followed by /l/ in a closed syllable ($\beta = -183.805$, $p = 0.0088$). In addition, the vowel is backer among speakers who moved to the suburbs ($\beta = -50.261$, $p = 0.0256$, cf. fig. 4).

Fig. 4: LOT production in South St. Louis

Both effects of residence, then, are in the expected direction. Speakers who remained in the city are more conservative in production than speakers who moved to the suburbs, as both the lower NORTH vowel and fronter LOT vowel are more ‘city-like’.

Although the TRAP system is changing for younger speakers in St. Charles County, we nevertheless find an effect of employment on production. For the regression model reported here, I use speakers who work near home as a baseline, with a baseline utterance of TRAP preceding a voiced stop. The environment following the vowel is well-known to condition variation even in the NCS system that lacks allophonic variation (Goodheart 2004; Labov, Ash and Boberg 2006; Duncan 2018). Duncan found that manner of

articulation, place of articulation, and voicing of the following consonant all condition variation in Greater St. Louis.

As summarized in tab. 2, in this subsample we find effects of manner and voicing, as well as speaker age, employment, and interactions between age/manner and employment/manner. There is no fixed effect of place of articulation in the subsample. The age/manner interaction shows that the speakers are adopting the nasal TRAP system in apparent time. The vowel is raising in pre-nasal contexts and lowering elsewhere. The main effect of employment shows that the speakers who commute toward the city have a higher vowel than those who work near home (fig. 5, illustrating the effect in pre-stop contexts), while the interaction shows that pre-nasal tokens are lower among those who commute. The overall effect, then, is that even as speakers in St. Charles County shift to a nasal system, speakers who commute toward the city have less of a nasal system because their pre-nasal and pre-elsewhere tokens are closer together in F1. In other words, commuters have a more NCS-like TRAP vowel, and therefore a more ‘city-like’ TRAP vowel.

Tab. 2: Regression model of TRAP production in St. Charles County

	Estimate	Std. Error	df	t value	Pr(> t)
Intercept (<i>bad</i> , work near home)	705.965	14.816	77.2	47.649	<<0.0001
Manner--Nasal	-149.408	15.688	258.2	-9.524	<<0.0001
Manner--Fricative	18.454	15.499	337.0	1.191	0.2346
Manner--/l/	-8.091	34.151	390.7	-0.237	0.8129
Voicing--Voiceless	41.676	14.237	206.0	2.927	0.0038
Occupation--Commute	-35.731	16.339	18.8	-2.187	0.0416
scale(Age)	-25.596	7.680	19.1	-3.333	0.0035
Manner--Nasal:scale(Age)	39.094	8.510	794.4	4.594	<<0.0001
Manner--Fricative:scale(Age)	2.575	9.472	814.3	0.272	0.7858
Manner--/l/:scale(Age)	41.741	18.217	802.4	2.291	0.0222
Manner--Nasal:Occupation--Commute	46.405	17.147	814.4	2.706	0.0069
Manner--Fricative:Occupation--Commute	16.836	19.339	816.8	0.871	0.3843
Manner--/l/:Occupation--Commute	36.207	42.040	818.1	0.861	0.3894

Fig. 5: Pre-stop TRAP production in St. Charles County

Note that the effect of employment, like that of residence, is in the expected direction. Speakers who commute, and who are presumably in more contact with conservative speakers, are more conservative in their TRAP production than those who work near home.

5.2 Questionnaire

Several factors emerged from the PCA analysis of the circling test. Of them, two appear to correlate with degree of contact. Factor 1 of the city attributes correlates with residence (see tab. 3), while Factor 2 of the suburb attributes correlates with employment (see tab. 4).

Tab. 3: Factors selected in PCA run of city attributes

Factor 1		Factor 2		Factor 3	
<i>Attribute</i>	<i>Loading</i>	<i>Attribute</i>	<i>Loading</i>	<i>Attribute</i>	<i>Loading</i>
Beautiful	−0.263	Poor	0.358	Fun	−0.262
Hardworking	−0.279	Dirty	0.344	Loud	−0.276
Good	−0.286	Unfriendly	0.341	Cultured	−0.308
Familiar	−0.300	Dangerous	0.310	Exciting	−0.316
Friendly	−0.318	Rich	0.284	Fast	−0.387
Happy	−0.322	Rude	0.282	Liberal	−0.417
		Sad	0.255		
<i>Scale</i>	0–6	<i>Scale</i>	0–7	<i>Scale</i>	0–6
<i>Range:</i>		<i>Range:</i>		<i>Range:</i>	
<i>Variance:</i>	0.197	<i>Variance:</i>	0.125	<i>Variance:</i>	0.101

Factor 1 of the city attributes appears to describe the city as a nice place to live, including attributes like *Hardworking*, *Friendly*, and the like. As such, I

label it as ‘City is nice place’. Because all of the loadings for this factor are of the same sign, I construct the scale for this factor by assigning speakers +1 for each of the listed attributes that they circle. In this way the score for this factor increases as speakers circle more associated attributes. Figure 6 shows what appears to be a clear relation between this factor and residence: scores are higher for speakers who remained in the city.

Fig. 6: ‘City is nice place’ scores among South St. Louis speakers

Linear regression does not show this difference to be significant ($\beta = 2.333$, $p = 0.058$). Judging from fig. 6, this appears to be due to the outlier speaker who moved to the suburbs, yet had a high score for the factor. Given that there are only twelve data points here, it is perhaps odd to refer to one of them as

an outlier; more data would help to determine how robust the pattern actually is. For now, we have an intriguing pattern which is worthy of discussion: speakers who see the city as a nice place tend to be the ones who remain in it.

Tab. 4: Factors selected in PCA run of suburb-only attributes

Factor 1		Factor 2	
<i>Attribute</i>	<i>Loading</i>	<i>Attribute</i>	<i>Loading</i>
Clean	-0.251	Beautiful	0.288
Wholesome	-0.257	Closed	-0.275
Beautiful	-0.263	Conservative	-0.308
Hardworking	-0.269	Quiet	-0.326
Good	-0.271	Slow	-0.378
Happy	-0.287	Boring	-0.396
Friendly	-0.290		
<i>Scale Range:</i>	0–7	<i>Scale Range:</i>	-1–5
<i>Variance:</i>	0.210	<i>Variance:</i>	0.099

Factor 3		Factor 4	
<i>Attribute</i>	<i>Loading</i>	<i>Attribute</i>	<i>Loading</i>
Dangerous	0.365	Religious	0.373
Rich	0.337	Boring	0.289
Poor	0.332	Slow	0.258
Liberal	0.259	Clean	-0.276
		Normal	-0.286
		Safe	-0.313
<i>Scale Range:</i>	0–4	<i>Scale Range:</i>	-3–3
<i>Variance:</i>	0.082	<i>Variance:</i>	0.055

Factor 2 of the suburb attributes describes suburbs in a negative light, including attributes like *Closed*, *Boring*, and the like. As such, I have labeled it as ‘Suburbs are dull’. Here, attributes have both positive and negative loadings on the factor. In order to construct the scale, I assign -1 if a speaker circled *Beautiful*, while all other responses receive +1. Figure 7 again shows

a clear relation between the factor and employment. Speakers who work near home have low scores, while those who commute toward the city have high scores. Linear regression does find this to be a significant correlation ($\beta = 2.267$, $p = 0.0006$), despite the limited number of data points. It appears, then, that speakers who see suburbs as rather dull are the ones who commute to work.

Fig. 7: 'Suburbs are dull' scores for St. Charles County speakers

6 Discussion

The production data shows bidirectional effects of contact. In one direction, speakers raised in the city who moved to the suburbs, putting them in contact with less conservative speakers, have less ‘city-like’ speech than peers who remained. In the other direction, speakers from St. Charles County who commute toward the city for work, putting them in contact with more conservative speakers, have more ‘city-like’ speech than peers who work near home.

In this section I will discuss these results in the context of the questionnaire results. These showed that speakers’ attitudes toward place, such as whether one views the city as a nice place or believes the suburbs are dull, are linked to the degree of contact that one has with others in the region. Such attitudes by no means express the entirety of speakers’ place-based identity, but are, I argue, an element of it. I recognize that because we are dealing with rather small sets of speakers, and because the questionnaire data has been reduced to single data points per speaker, we are limited in the strength of the conclusions that can be drawn. I suggest, however, that the data, limited as it may be, is intriguing enough to warrant discussion.

Before proceeding with this discussion, I should remark upon the residence effects in particular. Recall that the residence factor nearly overlaps with the kind of high school that speakers attended (Duncan 2020). While in isolation the linguistic results could potentially be interpreted as an education type

effect, this questionnaire result seems less attributable to education type. Why would students who enrolled in Catholic schools fifty years ago think the city is nicer than students who were in public schools at that point? At the same time, that we find similar types of effect (linguistic difference and a positive/negative evaluation of place) for the employment and residence factors suggests to me that we are dealing with similar phenomena. For these reasons, I believe that we can tentatively proceed under the assumption that the residence effects are due to residence and not education type.

Essentially, we have dual findings that linguistic production is correlated with the degree of contact one has within a metropolitan area, and that the degree of contact one has within a metropolitan area is correlated with aspects of one's place-based identity. At first glance, this appears to set up a syllogism: given our results, we would conclude that linguistic production is linked to place-based identity. That is, older speakers make use of the NORTH and LOT vowels to index their attitude toward the city, and younger speakers make use of the TRAP vowel to index their attitude toward suburbs. This view would echo approaches to linguistic variation as stylistic practice (Eckert 2008), and there is certainly precedent for this interpretation with respect to place.

Reed (2016), for example, shows how PRICE monophthongization and the use of rising pitch accents correlate with speakers' rootedness in a small Appalachian community. His analysis makes reference to population flows as well. He notes that older speakers score higher for rootedness than younger

speakers. Reed (*ibid.*) suggests that because the community in question has lost a great deal of its population in recent decades, this discrepancy in rootedness scores is likely because the remaining older speakers are those who are rooted in the community, whereas less rooted younger speakers have not yet had the opportunity to leave. Interpreting our results as showing place-based stylistic practice thus puts us in good company.

I argue, however, that this is not the full story. The production data truly looks like it shows contact effects; the pattern we see is what we would expect to see if speakers were accommodating to the speech patterns of those they were in contact with. We should not discount these effects in our interpretation of results. For this reason, I suggest that the production-identity link is indirect and mediated by contact. This raises the question of how to understand the link between contact and identity.

Let us begin by considering how speakers enter into contact in the first place. Previously, I focused on market- and policy-driven reasons. For example, some industries, such as the biotechnology industry in Greater St. Louis, are limited in location, and workers in those industries must work in specific locations. Regardless of where these speakers live, they need to commute to these locations. With respect to residence, some individuals, particularly African Americans, are excluded from parts of the housing market, limiting where they can live.

However, the marketplace is not the sole factor that influences where individuals live and work, because contact is not solely market-driven.

Personal choice plays a role as well. Individuals, particularly white middle class individuals, may have a choice of affordable and available housing in multiple locations within a region. Furthermore, because American metropolitan areas like Greater St. Louis are strongly automobile-reliant, individuals with access to a vehicle are able to travel anywhere within the region for work. This means that individuals have a degree of choice in where they live, meaning that migration from the city to suburbs is not merely a policy result.

Similarly, decentralization of metropolitan areas (and more generally, demand for local services) makes several types of employment like teaching, nursing, retail, etc., in demand throughout the region. For many individuals, this means that there is an element of choice in where they work as well. Consider the case of Sarah W., who lives in St. Charles County and is a high school teacher in St. Louis County. She has a reasonably high-demand occupation, and as such could find employment in either county. At the same time, she could quite easily find housing near her workplace. She has thus made two choices: to work in St. Louis County, and to continue to live in St. Charles County. Noting a role for choice is not to claim that market forces play no role in location of occupation and residency. Rather, there are market- and desire-driven factors. Indeed, for many speakers the market-driven factors will likely prove as strong or stronger than any desire-driven factors. However, the sample of white, middle class women discussed here is afforded more freedom in housing and employment by market forces than speakers

from other demographic groups, and as such has more room for desire-driven choice with respect to these.

I suggest that speaker identity is one such desire-driven factor that influences where one lives and works within the area. What we ultimately find is that contact is tied to evaluation of urban/suburban space in Greater St. Louis, and as such, I suggest that contact is tied in part to one's place-based identity. There is a bit of a chicken-and-egg situation here—does identity influence contact, or does contact influence identity? Because this finding applies not only to St. Charles County residents, but also South St. Louisans who left the city, I argue we have the former situation. In the city, having strong positive opinions about the city could convince an adult to remain in the city rather than move to the suburbs. Likewise, having negative opinions of the suburbs could convince a young adult in St. Charles County to look for a job closer to the city, even if it is still in St. Louis County and even if they could find a similar job in St. Charles County. In these ways, having opportunities for contact is mediated by one's disposition toward the city and suburbs.

This means that in some respects, we should view contact within the metropolitan area an outcome of stylistic practice. Here I expand Eckert's (2008) discussion of how identity is expressed through linguistic practice to extend to social practice as well. In this interpretation, individuals express identity and their urban/suburban dispositions through their social acts within the region, including where they choose to live and work. Accordingly, older

speakers who grew up in the city and choose to remain or leave are indexing their attitude toward the city. Likewise, suburbanites who choose to commute or to work close to home are indexing their attitude toward suburbs.⁶

This is somewhat like Eckert's (2000) comparison of fashion choices among jocks and burnouts in a suburban Detroit high school, as well as her (2010) observation of pre-adolescents learning to express themselves through fashion or behavior. Note, however, that in the latter situation Eckert (2010) still directly connects linguistic practice to identity. In contrast, I wish to solely emphasize the link between social practice and identity.

This approach yields our indirect link. The choice of where to live and/or work indexes identity, which results in speakers' choices leading to differing degrees of contact. Because this means that speakers are encountering more or less conservative speakers, the patterns of variation that we find really are contact effects. As such, I do not suggest that speakers are drawing upon the linguistic features under study to engage in stylistic practice; an NCS TRAP vowel for St. Charles County speakers who work in St. Louis County is not stylized practice that reflects place-based identity. But the fact that contact arose in the first place *is* a case of such stylization. This stylized social

⁶ Eckert (2000) specifically describes the territorialization of space by jocks and burnouts, both within the school premises and the neighborhood at large. An anonymous reviewer asks whether a focus on such territorialization might improve this analysis over the more general reliance here on 'identity.' In the context of Eckert's work, usage of space is just one of multiple ways in which students index social categories. As such, it is simply one form of social practice. For this reason, it seems less than prudent to privilege territorialization over other forms of social practice, particularly given the limited forms and quantity of data available here.

practice then led to contact effects. In this way, identity indirectly plays a role in metropolitan linguistic variation.

7 Conclusion

In this paper, I have explored linguistic variation in what in most respects amounts to a metropolitan dialect in Greater St. Louis. This dialect is changing; suburbs are leading the city in retreat from traditional urban features (Duncan 2019). As such, the metropolitan dialect exists on a continuum in some ways, with advanced and conservative speakers. The findings from Duncan (*ibid.*) suggest that the poles of this continuum are distributed spatially between suburbs and the city, respectively.

However, our exploration of urban/suburban contact, operationalized as employment and residence, shows that the continuum of advanced/conservative speakers does not map perfectly to space. Rather, the degree of contact that speakers have with more or less conservative speakers within the metropolitan area proves quite important; urbanites who moved to the suburbs are less ‘city-like’ in production than their peers who remained in the city, while suburbanites who commute toward the city for work are more ‘city-like’ in production than their peers who work close to home.

We also find that whether speakers enter into contact situations is mediated by their evaluation of place, which I suggest is part of their place-based

identity. Our results thus direct us toward a broader point: problematizing the identical treatment of speakers in a metropolitan area because they reside in different places (city vs. suburb, for example) is not enough. Rather, we must take into account the way metropolitan speakers interact with each other, and the reasons why they may or may not engage in such interactions. As shown here, these interactions and the identities that mediate them are themselves crucial to our understanding of linguistic variation in metropolitan areas.

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