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1 Introduction

The study of urbanization in dialect geography is a relatively new area of investigation, having been examined previously in only a handful of studies published within the last decade. Of these, the majority has concentrated on linguistic variation in the South (e.g. Thomas 1997, Tillery and Bailey 2003, Tillery, Bailey, and Wikle 2004) and has revealed that, as urbanization increases throughout large population centers throughout the region, dialect divisions are being spatially reorganized within the local context of the suburbs surrounding core urban areas. In essence, urbanization is leveling previous divisions and promoting the use of innovative features in its wake.

The current study attempts to increase our knowledge base on the impact of urbanization in the Midlands region, using a focused, localized dialect geography study of the spread of linguistic change in Columbus, OH, a metropolis located at the cusp of the North and South Midlands (as defined by Carver 1987 and Labov, Ash, and Boberg 2006). Columbus provides a salient context for studying this impact because the outcomes of urbanization are so clear in how they have affected the present day make up of the community. As a result of urbanization, and exacerbated by Columbus's policy of annexing surrounding rural and suburban space, the community has been transformed, from one which was once a small but thriving capital, to one which is now a large and complex metropolis. (See Durian 2006 for maps of Columbus.)

Specifically, this study presents a quantitative investigation of the distribution of the variable (str) (the consonant cluster occurring word initially in *street* or word medially in *construction*) in neighborhoods across Columbus, as well as nearby sounding suburbs located just on the outskirts of the city, which have been impacted by urbanization and annexation throughout the second half of the 20th century (Hunker 2001). Following previous studies of (str) in English (e.g. Labov 1984, Shapiro 1995, Lawrence 2000, Labov 2001, Janda and Joseph 2003), the alveopalatal [ʃtr] is treated as the prototypical vernacular variant and alveolar [str] as the standard. The data are

* An expanded version of this paper is available online as Durian (2006).

drawn from a rapid anonymous survey of 120 White store clerks modeled after Labov (1972) and interview data elicited from 32 White native English-speaking metropolitan and suburban middle-class residents as a part of a recent dialect survey of Central Ohio.

The results demonstrate that [ʃtr] is more strongly associated with urban speakers, although its use appears to be increasing in all areas studied. The strongest social factors conditioning its variance are class, age, and the location in which the speaker was born and raised. The strongest linguistic factor is the word environment in which it occurs. Furthermore, the results suggest that [ʃtr] may be used throughout this community as a marker of “urban affiliation,” with urbanization, within-area migration, and class-based dialect contact serving as the principle conduits through which its social and geographic diffusion has occurred.

2 Previous Studies of (str) in English

(str) variance in North American dialects of English is typified by a cluster initial sibilant /s/ that can show varying degrees of palatalization, often perceived by listeners as an [s]-like sound with an added hushing quality. It has been argued previously in the literature that the palatal /s/ in these clusters is triggered via either a process of long distance assimilation to the cluster final /r/, making [s] become more retroflex and rounded (Shapiro 1995), or adjacent assimilation of /s/ to /r/, such that [s] becomes affricated via assimilation with the following alveopalatal [t] (Lawrence 2000). A third possibility, suggested by Janda and Joseph (2003), is that the retraction/palatalization of /s/ is triggered neither by /r/ or /r/, but perhaps a preceding or following vowel. This latter possibility is explored in more detail in the present analysis.

In Columbus, (str) has three gradient realizations. There is the standard variant [str]; an intermediate variant that is typified by an /s/ that shows retroflexion without pronounced rounding [ʃtr]; and the rounded variant [ʃtr], which is the more prototypical vernacular realization. In the results discussed here, I investigate the realization of (str) clusters in their intermediate and palatal [ʃtr] variants. Comparative spectrograms of a standard [str] and a prototypical [ʃtr] realization are included in Durian (2006).

Turning to the social distribution of (str), Labov (1984) and (2001) has briefly commented on its occurrence in the Philadelphia speech community, via data he obtained during the mid-1970s. Through these results, we learn that [ʃtr] is more commonly associated with working-class rather than middle-class speech by Philadelphians when rated during subjective evaluation tests (2001:206–222), and that it is fairly pervasive in Philadelphia speech

(1984:50). However, even though these facts about [ʃtr] were noted, explicit data documenting its distribution by factors such as age, sex, or social class were not provided in these publications.

These discussions have allowed us to obtain an initial glimpse of (str) variance in North American English dialects, but at present, they have left us with two important unanswered questions. First, beyond the possible cluster-internal conditioning of /s/ contributed by /t/ and /r/, what influence do other surrounding environments in which /str/ clusters occur have on triggering palatal realizations of this /s/ in this cluster? And second, what does the actual social distribution of (str) variance look like in an urban setting? I will now attempt to answer these questions, as well as document urbanization as a possible mechanism for the transmission of innovative variants of (str).

3 Social and Linguistic Distribution of (str) in Columbus

To obtain detailed information on the social, geographic, and linguistic distribution of (str) in Columbus, I choose to use 2 data collection methods: a rapid anonymous survey of Columbus store clerks, and recorded sociolinguistic interviews. The rapid anonymous survey (RAS) was used because it allowed me to collect a large body of information concerning the distribution of (str) by attributes such as age, gender, and social class in a short time period. In regards to class especially, this method was useful, because it allowed me to elicit data from a variety of informants that I might not have been able to contact without difficulty otherwise. Included below is a very brief summary of the results of the RAS, to conserve space. A far more detailed discussion is provided in Durian (2004).

3.1 The Rapid Anonymous Survey of Columbus Store Clerks

The RAS was modeled after Labov's use of the technique to study the social distribution of (r) in New York Department Stores in 1962 (Labov 1972). Via the RAS, I interviewed 120 White informants working in 29 stores at 3 of the shopping mall locations located throughout the Columbus area (City Center, Easton, and Polaris). From each of the survey areas, I elicited data from 40 informants (20 male/20 female), using a cell selection method to ensure that a roughly equal number of informants was selected from across the mall areas based on the class status of the stores in which they worked, their sex, and their perceived age. To quantify age (which was estimated), I used a five-year time window in an attempt to obtain a reliable estimate. This method yielded a total of 240 (str) tokens (120 less emphatic, 120 more emphatic) collected from informants divided into three age groups: 15-30, 35-

50, and 55-70 (60 informants each); and three social class groups in stores located across the mall locations: working class, lower middle class, and upper middle class (60 informants each).

For the RAS, only word-initial /str/ tokens were elicited, in two speech environments: the first pronunciation of /str/, which occurred in a less emphatic speech environment, and a second pronunciation which occurred in a more emphatic speech environment. The second pronunciation always occurred following the first, when the participant was asked to repeat what he or she had said. Data were rated using a two-point scale based on impressionistic analysis of the realizations. Those tokens I perceived as having a more [ʃ]-like quality were coded as [ʃtr], while those tokens having a more [s]-like quality were coded as the standard realization [str].

Once data were coded and tabulated, I performed a logistic regression analysis of the 240-token corpus using GoldVARB, with [ʃtr] as the application value. This analysis showed that social class, age, sex, and speech environment were significant factors ($p < .01$) in conditioning (str) variance in the RAS data. Of these, social class and age were the two trends most relevant to the discussion of [ʃtr] realization for our present purposes. The youngest speakers (15-30 year olds) showed the strongest lead in [ʃtr] use overall (38%), regardless of speech environment, when compared to older speakers. This lead was less significant over the next oldest group (35-50) (29%), and was strongest over the oldest group (55-70) studied (8%). For social class, the strongest producers of [ʃtr] were those located within the working class (39%), followed closely by speakers from the middle class (26%), and then finally speakers of the upper middle class (8%). The implications of these findings will be explored in more detail in Section 4.

3.2 Middle-Class Interviews

Data for this portion of the study were collected via interviews recorded for my own Central Ohio Dialect Survey. The distribution of my sample is provided in Table 1.

Raised	Columbus		Suburbs		Present Day	Columbus		Suburbs	
	19-32	2	19-32	6		19-32	2	19-32	6
Women	38-67	7	38-67	1	Women	38-67	3	38-67	5
	19-32	4	19-32	4		19-32	1	19-32	7
Men	38-67	4	38-67	4	Men	38-67	3	38-67	4
	Total		16			9		22	

Table 1: Location and Sample Characteristics of Informants

Speakers were selected via judgment sample. In sum, I conducted interviews with 32 White middle-class informants, who were equally stratified by age (2 groups: 19-32 and 38-67 year olds) and sex, and distributed evenly among speakers born and raised in both the urban and suburban sections of Columbus.

The clustering of speakers into two age group cohorts reflects two sociologically relevant facts about them. First, they reflect a division among speakers based on those who grew up as Columbus's annexation policy was beginning to be implemented versus those who grew up as it was well underway. Second, in terms of the patterns of migration shown by these speakers for present-day location, they tend to reflect the general outcomes of out migration from the urban core to the suburbs among the larger Columbus population that I will discuss in more detail in Section 4.

To study their use of innovative variants of (str), I extracted tokens from digital tape recordings, and reference spectra, when used, were generated in PRAAT. All tokens were extracted from two conversational contexts (casual and quasi-conversational) and two word environments (initial and medial). Although the speech elicited during the quasi-conversational section was somewhat more formal than the purely conversational speech, using it allowed me to observe a more balanced number of tokens across all speakers than if only casual conversational speech was used. The first 10 tokens produced by each speaker throughout the course of an interview were extracted so that each contributed an equal number of tokens. As /str/ clusters occurs infrequently in speech and the interviews tended to vary in length, the range of conversational speech analyzed spanned roughly 20 to 50 minutes, depending on how talkative a speaker was.

To ensure that tokens were accurately categorized, particularly in the case of intermediate realizations, I listened to the majority of them on several occasions spaced out over a period of several months, so that potential "rater bias" could be better minimized. As well, in the case of "borderline" tokens, where a determination was difficult to make, I relied on spectrograms to categorize the data. I came to realize that both these strategies were a neces-

sity, as I found I had a tendency to rate tokens more liberally as intermediate or palatal during the first pass than in the successive passes.

In contrast to the RAS, where I only used two categories to mark (str) variance, here, I categorized tokens using a three point continuous scale based on my impression of the cluster initial /s/. Palatal tokens were coded as [ʃtr], intermediate tokens were coded as *intermediate*, and non-palatal tokens were coded [str]. For decisions in which I used reference spectra, cluster initial [s] realizations showing a high concentration of spectral energy at or below 2500Hz were coded [ʃtr]; those having a concentration of energy between 3000 and 3500 HZ were coded *intermediate*; and those with energy at or above 4000Hz were coded [str].

Once data were coded, the results were analyzed using logistic regression analysis in GoldVARB. For all analyses in this section, palatal and intermediate tokens were combined into one category and compared with standard realizations, since GoldVARB only allows for binomial comparisons of variance. The combined category intermediate/palatal [ʃtr] was used as the application value, and all runs made use of the entire 316-token corpus. The social factor groups considered were sex, age, the location in which speakers were born and raised, and the location in which speakers currently live. The linguistic factor groups considered were preceding environment (the segment immediately preceding the /str/ cluster), following environment (the segment immediately following the /str/ cluster), and word environment (word initial vs. word medial). The following environment was defined as such, because I hoped to determine if the following vowel might have any influence of the rounding of /s/ in palatal realizations.

The final GoldVARB run, contained in Table 2, reveals age, the location in which the speaker was born and raised, and word environment are significant ($p < .01$).

Factor Type	Group	Factors	Weight
Social	Age	19-32	0.615
		38-67	0.383
	Location Born & Raised	Columbus	0.580
		Suburbs	0.398
Linguistic	Word Environment	Word Initial	0.422
		Word Medial	0.600

Table 2: Final GoldVARB Run for Interview Results
input= 0.246; *Chi-square/cell* = 0.6291; $p < 0.01$

Turning first to the significance of word environment, the strong impact of this linguistic factor can be seen in Figure 1. This impact can be seen most clearly if we consider the trinomial distribution of (str) rather than the binomial distribution considered in the GoldVARB analysis. Here, we see that word medial shows a clear lead over the word initial environment, with intermediate realizations occurring 6% more frequently, and palatal realizations nearly twice as frequently (6.7% vs. 12.9%).

Although not statistically significant in the GoldVARB analysis, when we take a closer look at interaction of preceding environment with word environment, an interesting finding emerges. Earlier, it was discussed that Janda and Joseph (2003) provide evidence that challenges the explanations put forth by Lawrence (2000) and Shapiro (1995) that [ʃ] in /str/ clusters occurs through one of two possible processes of assimilation to following /t/ or /r/. They observe that [ʃ] is beginning to occur in other environments removed from the /_tr/ cluster, and that /_tr/ simply represents the point of origination for this innovation.

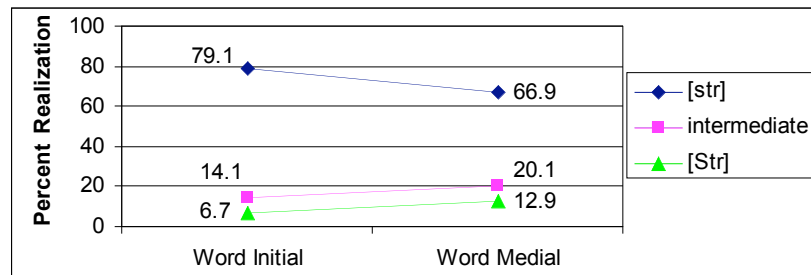


Figure 1: Linguistic conditioning of (str) by word environment

The evidence presented in Figure 1 appears to support their view, as it suggests that [ʃ] initially occurs either due to feature spreading of the [+high] feature from a preceding segment (as in the case of a high front vowel) or possibly lenition (triggered by a morpheme boundary) in word medial position. This is an interesting idea, as /s/ in medial position always occurs at a morpheme boundary, and as the distribution in Figure 2 demonstrates, frequently co-occurs with a preceding high front vowel (as in *restriction* or *district*). Of these possibilities, assimilation seems the stronger candidate, as high front vowels are the group that most often precede intermediate and palatal [ʃtr] realizations throughout the study.

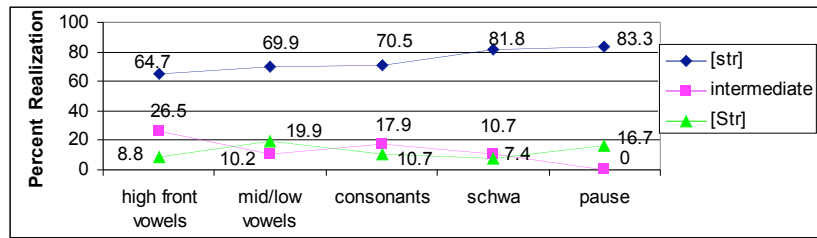


Figure 2: Linguistic conditioning of (str) by preceding environment
 χ^2 (preceding environment)*(str) = 12.080 (d.f. 8) ; $p = n.s.$; $n = 316$

The possible influence of high front vowels on palatalization has been previously attested in historical linguistics literature. In early Romance, Vegliote, and Gallo-Romance, velar and dental segments preceding high and mid-front vowels underwent palatalization that is a result of feature spreading of the [+high] feature of those vowels (Hock 1991:75). This evidence is crucial to the argument that a hierarchy of palatality exists in these and other languages. What is different about the process here is that it occurs when /s/ follows high front vowels instead of preceding them. On this analysis, it would appear that the point of origination for palatal /s/ in these clusters is:

/s/ > /ʃ/ / _____ [tr]
 V
 [+high]
 [+front]

If this is true, then other occurrences of [ʃ] in the /_tr/ environment represent an extension of this point of origination to other contexts. Taking this idea a step further, it suggests a possible historical trajectory for (str) in English, in which the word-initial environment began to show palatal /s/ variance at a later point in time than the medial environment. This might explain why word initial tokens show less palatal and intermediate realizations than word medial tokens. It should be noted that this analysis further supports Joseph and Janda's (2003) hypothesis that /str/ is the point of origination for [ʃ] in English, and while also refining it, by providing more specific phonetic detail as to how the process may have first began.

Moving to the social factors, we see that in the significant GoldVARB model, age is divided into two categories: 18-32 and 38-69, a division that corresponds exactly with the two generational cohorts from which speakers were initially sampled. A less significant, but perhaps more illuminating, co-

variant pattern of variation is revealed when age is viewed using three-category distinctions to divide both speakers and realizations of (str).

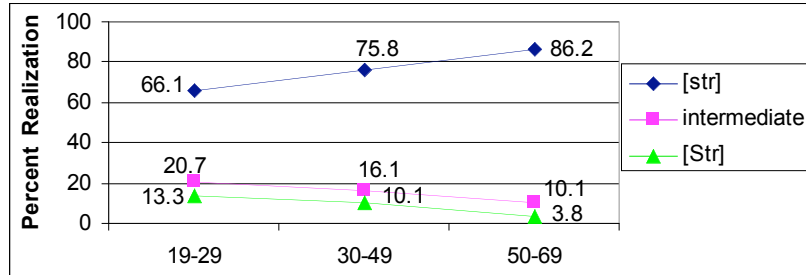


Figure 3: Distribution of (str) by age among middle-class speakers

The distribution of speakers by this age grouping, as illustrated in Figure 3, reveals that (str) variance among the middle class in Columbus shows a strongly linear distribution. The covariance of this distribution with the location in which speakers were raised (the other significant social factor) is significant at the $p < .03$ level. Here, we see that younger speakers show more pronounced realizations of vernacular variants of (str), particularly [ʃtr], when compared with older speakers. At the same time, the strongest increase in intermediate use is shown between the middle and oldest group. These patterns show a gradient increase in the use of [ʃtr] by generation among the middle-class population overall, with more pronounced changes between intermediate and [ʃtr] realizations occurring as age decreases.

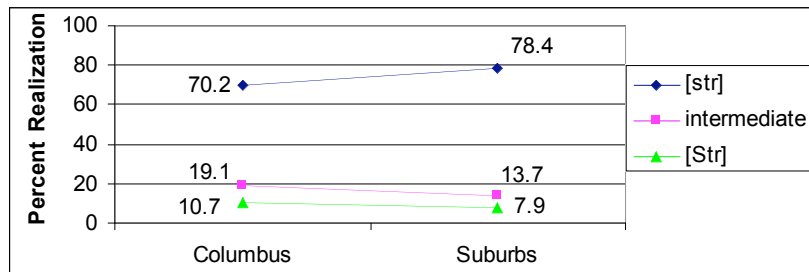


Figure 4: Distribution of (str) by location in which speakers were raised

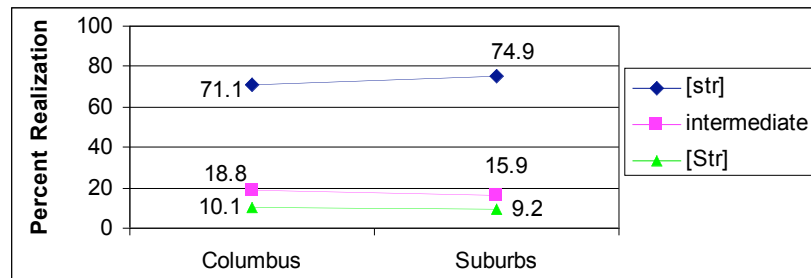


Figure 5: Distribution of (str) by location in which speakers now live

Turning to the significance of the location in which speakers were born and raised, another interesting trend is revealed when this pattern of variation is compared with that of the location in which speakers currently live. As with age, this pattern is more robustly demonstrated when we look at the trinomial categorization of (str) rather than the binomial categorization used in the GoldVARB runs. As Figures 4 and 5 reveal, the variation based on location raised was significant in the logistic regression analysis, while present location is not, because it shows a stronger pattern of differentiation among speakers. There is an 8% overall difference among speakers raised in Columbus versus the suburbs. Coupled with the age data considered above, these figures reveal that innovative use of (str) has increased in the suburbs over the sampled time frame. Furthermore, the combined consideration of the patterns in Figures 3, 4, and 5, along with the results contained in table 2, indicates that the increased use of intermediate and [str] realizations are spreading outward from the urban core into the suburban periphery. Thus, as urbanization has increased throughout the area, so has the spread of vernacular variants of (str), via a dispersion pattern that is hierarchical.

4 Urbanization and the Spread of (str) in Columbus

Combining the results of the analyses presented in Section 3, we see that the most significant social factors conditioning (str) variance are age, class, and the location in which speakers were born and raised. Age appears to be the most significant factor overall, having been confirmed by the speech patterns observed in both the RAS and the sociolinguistic interviews. I will now move to a deeper interpretation of the social factors.

Looking at speakers' patterns of migration may provide us with the key to explaining the actual transmission process of (str) from Columbus to the suburbs within the context of urbanization. The distribution of the infor-

mants based on geography in the sample provides a fairly accurate representation of patterns of migration for the general population of residents who were born in the area and have stayed in the area throughout their lives across the greater Columbus community. Older speakers show a stronger tendency toward core-to-suburban movement, while younger speakers show more suburban-to-core movement, partly as a result of work opportunities being available to them in the core. This reverse pattern among younger speakers may also be partly motivated by changes in perception concerning areas within the core, which have resulted from revitalization efforts over the last 10 to 15 years in neighborhoods such as the Short North, the Arena District, and portions of the North Campus area bordering the Clintonville neighborhood (see Hunker 2001:Ch. 9 for more on this issue).

It is interesting to note how these patterns have played out socio-geographically. Among the speakers who were raised and continue to live with the urban core, all reside either in Northern or Northeastern Columbus. Three of the six non-migrating speakers were raised, and continue to live, in Clintonville. The other 3 were raised, and continue to live, on either the North or Northeast side, but have moved around within these areas.

Among these areas, Clintonville, a strongly middle-class neighborhood located on the Northern boundary of Columbus proper where socioeconomic status (SES) has always remained fairly high, is perhaps the one that most clearly showcases why this is so. During the 1970s and 1980s, when a number of other areas within the core experienced periods of pronounced outward migration of Whites due to desegregation of the public schools, Clintonville residents adopted an active strategy of community investment in neighborhood schools. Thus, school quality remained high, which helped to negate fear among residents that it would become compromised when the Clintonville schools became desegregated (Foster 1997). This kind of emphasis on community cohesion has apparently had a strong impact on keeping residents in the neighborhood, as it has the highest concentration of non-migrating speakers in the study.

Among the speakers who have since migrated from the core to the suburbs, all were born and raised, or spent a significant portion of their lives, in East, West, and South Columbus. In comparison to North and Northeast Columbus, these areas have traditionally been among the more economically blighted, particularly areas throughout the East and South sides. During the period of the Great Migration, the East side underwent a period of marked resettlement, such that the area changed from one that was racially mixed to one that is now nearly entirely black; the same is also true for pockets throughout the South side. Within these areas today, White residents that do

remain tend to be of markedly lower SES than their counterparts in other portions of the Columbus MSA (Hunker 2001).

Interestingly, these speakers show some of the strongest patterns of both intermediate and [ʃtr] realization among their cohorts, and they appear likely to do so as a result of being raised in more working-class areas. Having resettled later in their lives to the suburbs, they appear to be at the forefront in advancing the spread of the vernacular variants of (str) within the larger community. Of these speakers, the largest cluster is older women who moved to the suburbs after they completed college and have since raised families there.

Evidence for the linguistic influence of these women can be seen in a small sample of three of my informants. They are a grandmother, mother, and granddaughter, the grandmother and mother having been raised on the West side, and the granddaughter raised in Grove City, a suburb located on the cusp of Columbus proper to the Southwest. The linguistic behavior of these women is shown in Figure 6. As these data illustrate, [ʃtr] usage increases in robustness from grandmother to mother to granddaughter. This example demonstrates how older women who grew up in the urban core and later moved the suburbs act as transmission agents for [ʃtr].

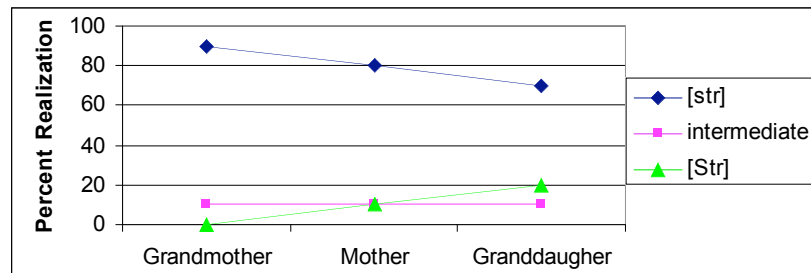


Figure 6: Distribution of (str) among three generations of speakers

These older female speakers can be compared with those studied by Labov in Philadelphia (2001), in which he found that these informants tended to be what he refers to as “linguistic leaders of change” (cf. 323–411; see also Eckert 2000:213–228). As with the case of Labov’s leaders, the background of these women places them in a strong position to be linguistically influential. They grew up in areas in which working-class speech would have been pervasive. If the patterns revealed by the RAS are accurate, it is indeed possible that older speakers in these areas were using more innovative realizations of (str) when they were growing up. Thus, during the lan-

guage acquisition process, the women would likely have been exposed to these innovative speakers, who served as their speech models.

After college, the women moved geographically to more upwardly mobile areas in the suburbs, while at the same time, they moved upwards on the ladder of social mobility. They are now securely situated in the middle class, placing them in an ideal position to be the transmitters of innovative linguistic variables such as intermediate and palatal (str) variants. As well-situated transmitters, they are in position not only to influence other older speakers with whom they come into contact on a daily basis, but also younger speakers with whom they interact in their professional lives.

Beyond migration and class-based dialect contact patterns, urbanization also appears to have affected speakers' mindsets about culture and community in the larger area, which is reflected linguistically by speakers' apparent use of [ʃtr] as a marker of "urban affiliation." Tentative evidence for this conclusion is presented in the comments made by speakers born and raised in Columbus proper, the majority of whom expressed pride about growing up in the "urban" part of Columbus. Unlike the speakers who were born and raised in the suburbs, these speakers seemed more optimistic about the expansion of Metropolitan Columbus into surrounding areas, and they expressed a qualitatively higher level of satisfaction in the local arts, restaurant, and cultural activities "scene" than suburban born speakers. They also seemed more comfortable with the "progress" Columbus has made over the last 30 years in becoming more like other urban cities (e.g. Chicago, New York, Philadelphia), and the majority were vocally dismissive of the popular stereotype of Columbus as a "cowtown."

Although not yet quantifiable, the meta-linguistic behavior of these speakers appears to make them more naturally receptive to using innovative variants of (str) than their suburban-raised counterparts. Generally, speakers showing a higher level of "urban affiliation" showed a higher use of (str) than their counterparts, who show lower levels of affiliation in the interviews, regardless of the location in which they presently live. More of these speakers were raised in Columbus proper than the suburbs, and so they showed this tendency more robustly, but suburban-raised speakers who used the innovative variants of (str) more frequently also tended to show more affiliation with the urban core than their peers.

5 Conclusion

The results I have presented in this study ultimately present the first steps in the larger process of documenting the diffusion of linguistic variation in the

Columbus community, and in particular, innovative variants of [str]. In a more idealized version, I would rely solely on spectra to rate the tokens, as this would provide more reliable results than impressionistic analysis. In addition, I would collect comparable data from working-class informants, so that the effect of class on the use of [str] can be more explicitly tested than they were in the RAS. In a future study, I intend to incorporate these changes and explore the issues I have investigated here in more extensive detail.

However, these issues aside, the evidence I have presented suggests that urbanization has had a powerful impact on the spread of [str] throughout Columbus. Age and social class—the significant social factors revealed by the combined analysis of the RAS and middle-class interviews—serve as strong conduits for this spread, while the significant changes in the distribution of [str] based on the location in which speakers were raised versus where they live now, quantitatively demonstrates the robustness of this force in leveling local dialect differences and promoting the diffusion of innovation in this community. Furthermore, the linguistic patterns revealed by this analysis have led us to a deeper understanding of the potential point of origination for this sound change as it occurs in American English dialects.

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