
RESEARCH PAPER

A Sociolinguistic Analysis of Word-Final /s/ Aspiration in a Rio de Janeiro Favela

Edvan P. Brito

University of Arkansas, Fayetteville, US

brito@uark.edu

Following the theoretical and methodological principles of Variationist Sociolinguistics, this paper analyzes the use of the aspirated variant of postvocalic /s/ by residents of City of God, a predominantly-black neighborhood in Rio de Janeiro that is widely known as a favela (roughly, shantytown or slum). The analyzed data consist of seventeen sociolinguistic interviews conducted in 2015 with twenty-two residents of this community. The quantitative analysis included six social variables—race/color, regional origin, age, gender, education, and speaker—as well as six linguistic variables—preceding vowel, following sound, syllabic stress, number of syllables, grammatical category, and word. Race/color, age, and all the linguistic factors considered in the analysis were selected as statistically significant to the occurrence of /s/ aspiration. This study indicates a possible connection between aspiration and race/color and stresses the importance of including racial identity as a relevant factor in sociolinguistic studies in Brazil, especially those focusing on favelas and other similar urban communities.

Keywords: postvocalic /s/; sociolinguistic variation; Brazilian Portuguese; racial identity; place identity; favela

1. Introduction

This paper investigates the effect of linguistic and social factors on word-final postvocalic /s/ aspiration in the speech of individuals and groups of speakers from City of God, a predominantly-black¹ neighborhood widely known as a favela (roughly, shantytown or slum) in Rio de Janeiro, Brazil. Aspiration refers here to the instances in which postvocalic /s/ is realized as the voiceless glottal fricative [h]. The phonological variable of postvocalic /s/ has three other variants in Brazilian Portuguese, namely the alveolar, representing the voiced and voiceless alveolar fricatives [z] and [s], the palatal, accounting for the voiced and voiceless postalveolar fricatives [ʒ] and [ʃ], and deletion. Examples of this variation phenomenon would be the realization of /s/ in the adverb *apenas* ‘only’ and the noun phrase *casas bonitas* ‘beautiful houses’. In the first case, /s/ is just part of the lexical item but, in the second one, it adds the meaning of plural to the two elements of the noun phrase.

The alveolar and the palatal are considered standard variants of postvocalic /s/ and they can also index regional origin, as the former is more frequent in the interior of the country while the latter appears more in areas located along the coastline. Both aspiration and deletion, on the other hand, are considered nonstandard variants and so they are

¹ Following the Brazilian government, black movements, and social scientists, I use the terms Black and Afro-Brazilian interchangeably to refer to individuals who self-identify as both *Pardo(a)* ‘Multiracial’ and *Preto(a)* ‘Black’ in the census (Dos Santos & Anya 2006; Telles 2004).

loaded with a certain level of stigma as they can be associated with working-class speech and lower levels of education. However, this is especially true in the case of /s/ deletion given the fact that Brazilian Portuguese speakers may not be entirely aware of the status of aspiration. As an example, even a well-educated speaker may have some aspiration in their pronunciation of postvocalic /s/ but would completely avoid /s/ deletion. In this sense, it is possible that at the present stage /s/ aspiration still carries a first-order indexical meaning (Johnstone & Kiesling 2008).

Even though postvocalic /s/ is one of the most studied features of the Portuguese language, particularly in Rio de Janeiro (Callou 2009; Callou & Brandão 2009; Lacerda 1961; Lipski 1975, 1976; Noll 2009), most accounts on this variable have focused on the palatal variant and, to a certain extent, on /s/ deletion. Despite the fact that few studies of this variable have considered data from different social classes from Rio de Janeiro, including adolescents from underprivileged backgrounds (e.g., Gomes, Melo & Barcellos 2016; Melo 2017), the major analyses of postvocalic /s/ have looked at the speech of college-educated speakers, most of whom were interviewed for the Urban Standard Norm – NURC Project in the 1970s and again in the 1990s (Silva 1996). However, the percentage of Blacks ages 24 to 64 who had completed a college degree was only 2% in the 1970s and 4% in the 1990s. Among Whites, these percentages were 4% and 12%, respectively (Telles 2004). Given such discrepancy, it is possible to speculate that Blacks were not well represented in these studies. In the context of favelas, it is currently estimated that only 1% of their residents have completed a college education (Meirelles & Athaide 2014). In any case, the fact is that race/color remains an understudied social factor in Brazilian Portuguese sociolinguistic studies.

Therefore, the present paper is an attempt to fill this gap by providing an updated sociolinguistic variation analysis of postvocalic /s/ in a major Portuguese dialect with an emphasis on aspiration. In addition, this study contributes to the relatively new subfield of Raciolinguistics (Alim, Rickford & Ball 2016) by including race/color and regional origin not only as important social factors to the occurrence of this variable but also as essential elements within the discussion about favelas and other predominately-black urban communities in Brazil, the country with the world's second-largest Afro-descendant population. With these issues in mind, this paper is organized as follows. In the next section, I provide background information about postvocalic /s/ sociolinguistic variation in Brazilian Portuguese, focusing on aspiration. In section two, I explore some of the sociocultural aspects of favelas, which will lead to the methods section (section three), where I give more specific information about City of God, the speakers, and the data analyzed in the study. In section four, I present the results of the quantitative analysis of the data and a discussion of some of their implications. I end the paper with my final considerations in section five.

2. Studies on /s/ aspiration in Brazilian Portuguese

As mentioned above, the voiceless glottal fricative [h] is one of the four variants of postvocalic /s/ in Brazilian Portuguese (BP). Even though this variant has been a central topic among scholars dedicated to the study of sociolinguistic variation in Spanish, it has not received much attention among those who study postvocalic /s/ in BP. One of the reasons may be that /s/ aspiration is much more frequent in Spanish than it is in BP. For example, in some Spanish dialects aspiration accounts for more than 50% of the occurrences of postvocalic /s/ (e.g., 53.2% in Cuba (Terrell 1979), 77.6% in Nicaragua (Lipski 1984a, quoted in Lipski 1984b), and 53.6% in Puerto Rico (Terrell 1978; quoted in Lipski 1984b), while in some dialects of BP (e.g., the Cordeiro region in the northern part of Rio de Janeiro state (Gryner & Macedo 2000), Recife (Callou, Leite & Moraes 2002;

Ferreira 2001), Rio de Janeiro (Auler 1992; Callou 2009; Callou & Marques 1975; Guy 1981; Reis 1992; Scherre & Macedo 2000), Salvador (Callou et al. 2002; Lucchesi 2009) this variant represents less than 20% of the occurrences of this variable.

Also, the phonological environments in which /s/ aspiration occurs in Spanish are greater than in BP. For instance, while in Spanish it can occur before vowels, consonants, and pause (Lipski 1984b), in BP it occurs primarily before voiced consonants and is unlikely to appear before vowels and pause (Scherre & Macedo 2000). In addition, existing semantic restrictions of the Portuguese language limit the appearance of /s/ aspiration (and /s/ deletion) to word-final environments (Scherre & Macedo 2000), even though it may occur word-internally in high-frequency words (Auler 1992). A very common example of /s/ aspiration in mid-word position is the word *mesmo* ‘same’/ ‘really’, which is pronounced [mehmu] by most Rio de Janeiro residents regardless of socioeconomic status, level of education, or racial background. However, as a nonstandard variant of postvocalic /s/, aspiration tends to be avoided in formal contexts. As Auler (1992: 51) concludes, “aspiration is not a diatopic dialect marker; rather it is an indicator of a more relaxed speech, one that is not constrained by the standard norm, one that is characteristic of individuals who are not subject to social pressures related to their linguistic performance.”

A number of studies have dealt with /s/ aspiration in different dialects of BP, such as in the Cordeiro region in the northern part of Rio de Janeiro state (Gryner & Macedo 2000), Recife (Callou et al. 2002; Ferreira 2001) and Salvador (Callou et al. 2002; Lucchesi 2009). But, in what follows, I review a few studies that focused on this variant in Rio de Janeiro Portuguese, describing some of the linguistic and social factors that affect its occurrence in this dialect.

Callou and Marques (1975) conducted one of the pioneering studies of postvocalic /s/ sociolinguistic variation in Rio de Janeiro Portuguese, in which they also report on /s/ aspiration. Between 1970 and 1972, they conducted a survey to elicit linguistic data from 36 speakers from five areas of the city, namely Campo Grande and Jacarepaguá in the West Zone, Madureira in the North Zone, the North Zone (excluding Madureira), the Central Zone, and the South Zone. In addition to place of residence, Callou and Marques controlled for gender (male and female) and level of education (level 1 or more than 12 years of schooling, level 2 or 6 to 11 years of schooling, and level 3 or zero to 5 years of schooling). Race/color was not included as a factor in the study but the participants’ birthplace and that of their parents were restricted to the city of Rio de Janeiro. In their data (N = 2,669), there were only 13 cases (0.6%) of aspiration,² which were produced by speakers with the lowest levels of education (level 2 and 3). This variant appeared primarily in word-final environments, followed by voiced consonants, especially [v], [m], [n], and [d]. One of the reasons for the low number of occurrences of /s/ aspiration may have to do with the fact that the main instrument of data elicitation used by Callou and Marques was a set of fifty pictures, which participants were asked to identify. As most of the pictures required speakers to say a single word, this method made it difficult for the occurrence of aspiration, which, as was mentioned earlier, appears more frequently in word-final contexts followed by consonants.

In another study in which /s/ aspiration was featured, Scherre and Macedo (2000) analyzed interview data from sixty-four participants from Rio de Janeiro. The data they analyzed were part of the Census Corpus, which was collected between 1980 and 1983 (Silva 1996). The speakers were stratified by gender, age, and level of education, but only linguistic factors were included in the analysis. These factors were following

² This figure corresponds to the sum of the occurrences of aspiration (08) and what they called “aspiration + palatal” (05), which gave a total of 13.

sound, preceding vowel, lexical category, and a combined factor formed by position of /s/ (medial or final), number of syllables, and syllabic stress. In addition to the first person plural morpheme *-mos*, a few high-frequency words were added as factors, including the personal pronoun *nós* ‘we’, the adverb *mais* ‘more’, the conjunction *mas* ‘but’, and the adjective/adverb *mesmo* ‘same/really’. Aspiration represented 8% (625) of the 7500 occurrences of postvocalic /s/ in Scherre and Macedo’s data. When looking at following segment, they found that aspiration was mostly favored by voiced consonants, including laterals (.94), nasals (.87), voiced stops (.79), and voiced fricatives (.63). It was also favored by the voiceless fricative [f] (.62) and disfavored by voiceless stops (.37) and pause (.24). Looking at preceding vowel, which they coded as either high front vowels or other vowels, they found that aspiration was disfavored by the former (.39) and favored by the latter (.72). Aspiration was also favored in stressed word-final position, regardless of word size. Unstressed word-final position and both stressed and unstressed word-medial positions significantly disfavored this variant. Moreover, none of the grammatical categories considered in the study nor the first person plural morpheme *-mos* favored aspiration; however, this variant was significantly affected by all the lexical items included in the analysis, namely the personal pronoun *nós* (.77), the adverb *mais* (.74), the conjunction *mas* (.65), and the adjective/adverb *mesmo* (.71).

Auler (1992) focused on the lexical factors that influenced the occurrence of /s/ aspiration in the dialect of Rio de Janeiro. In this study, the author analyzed data from ten speakers, who were interviewed in 1982 and again in 1988. Aspiration represented 6.4% (N = 1035) of the occurrences of postvocalic /s/ in the first interview and 4.3% (N = 1021) in the second interview. Because /s/ aspiration was mostly concentrated in a few high-frequency words, the study suggested that the spread of this variant was being conditioned by a lexical diffusion process. In other words, linguistic change, in this case, was a result of the spread of lexical items that carried this variation phenomenon. Auler also found that four of the participants decreased or eliminated their use of /s/ aspiration from the first to the second interview. In six years, all of the speakers started working and moved from high school to college, except for one of them who moved from middle school to high school. The only speaker who had an increase in their use of the variant had finished eighth grade in 1982 and had not gone back to school by 1988. This points to a complex relationship between higher levels of education, participation in the workforce, and the use of nonstandard variants such as /s/ aspiration. Given Auler’s results, it is possible to say that individuals feel the pressure to standardize their speech to meet the linguistic requirements in contexts that require more standard-like language (Eckert 1997).

In addition to shedding light on some of the social and linguistic constraints to the occurrence of /s/ aspiration in BP, the above review points to the fact that race/color has not been explicitly included as a social factor in any of these studies. Ferreira’s (2001) comparative study of /s/ reduction or weakening in BP and Caribbean Spanish may be among a few existing variationist studies that have attempted to provide a discussion of the effect of racial identity on language variation in the context of Brazil. However, association with “African ancestry” was only established by the speakers’ participation in “African-based rituals” (30). According to the author, “membership to an ethnical [sic] or racial group is not immediately obvious in Brazil, at least for the majority of Brazilians” (30). Ferreira’s comment is probably based on the fact that, as members of a multiracial society, most Brazilians would place themselves somewhere in the middle in a black-white continuum, a point that I further explore in the next section.

Despite the difficulties in approaching race relations in Brazil, this discussion has appeared as a central element in studies in other areas of Linguistics, such as Interactional

Sociolinguistics (Flannery 2005, 2008a, 2008b), corpus-based Critical Discourse Analysis (Magalhães 2006), Ethnolinguistics (Castro 2001; Mendonça 2012), and Language Contact (Guy 1981, 1989, 2014; Lucchesi 2001; Lucchesi, Baxter & Ribeiro 2009; Naro & Scherre 2007). Even though these studies have made invaluable contributions to the study of the intersection between language and race in Brazil, one can conclude that the effect of race/color or racial identity remains understudied in BP sociolinguistic variation.

3. Favelas, race/color, and language

Favela is the popular term used to designate the different types of informal housing settlements found in Brazil. It has become part of mainstream popular culture, being portrayed in several media products, including songs, films, video games, *telenovelas*, and television series. As such, the concept of favela can be easily identified both nationally and internationally, mostly in association with crime, violence, drug trafficking, and poverty (Beaton & Washington 2014; Birman 2008; Perlman 2010; Robb Larkins 2015; Roth-Gordon 2017).

The Brazilian Institute of Geography and Statistics – IBGE (2011a) uses the term “subnormal agglomerates” in an attempt to account for the different types of informal housing that would be otherwise known as favelas. The main criteria used by IBGE to identify such communities take into consideration issues related to size (51 or more housing units), lack of proper ownership, and infrastructural problems (e.g., irregular streets and lots and absence or shortage of basic public services). Considering the differences between the official definition and the popular notion of favela, it is possible to say that there is a discrepancy that needs to be addressed to arrive at the reality of these places. The point here is that the perceptions that the general public has about favelas or other marginalized urban communities go beyond the official definition. In other words, people take into consideration not only the legal, geographical, and infrastructural characteristics of these places, but also issues of class, race/color, migration status, appearance, language use, among others (Beaton & Washington 2014; Meirelles & Athaide 2014; Perlman 2010; Roth-Gordon 2009, 2017).

Two examples of the mismatch between the official and the popular definitions of favelas are City of God and Cruzada de São Sebastião. City of God, the neighborhood featured in this study, is widely known and represented by the media as a favela (e.g., Lins 1997; Meireles & Lund 2002; Zaluar 1994), regardless of the fact that only 13% of its geographical territory actually falls under this category by government standards (Cavallieri & Vial 2012). Although not as famous as City of God, Cruzada de São Sebastião is also perceived by both insiders and outsiders in a similar fashion. This apartment complex, located in one of the most affluent areas of Rio de Janeiro, was the site for American anthropologist Jennifer Roth-Gordon’s (2017) research on language and race. According to Roth-Gordon (2017: 33), “[a]lthough it did not look or feel like a hillside shantytown, residents and outsiders commonly referred to Cruzada as a favela.” Given such disconnect between official and popular understandings of favelas and other similar communities, scholars dealing with them should go beyond the official definition to understand their constitutive sociocultural elements.

Looking at the issue of race, for example, one of the reasons to take this sociological concept into account is the fact that these communities have been disproportionately populated by Afro-Brazilians, the group formed by individuals who self-identify as both Multiracial and Black in the census. Based on data from the 2010 census, IBGE (2011b) found that 43.1% of Brazilians self-identified as *Pardo(a)* ‘Multiracial’, 7.6% as *Preto(a)* ‘Black’, 47.7% as *Branco(a)* ‘White’, 7.6% as *Amarelo(a)* ‘Asian’, and 1.1% as *Indígena* ‘Amerindian’. However, even though Afro-Brazilians (Multiracial and Black combined)

accounted for 50.7% of the population in that year, this group represented 66% of the country's favela residents (IPEA 2011). In the case of City of God, which had a population of 36,515 inhabitants in 2010, the percentage of Afro-Brazilians was even higher than the national result, accounting for 72.6% (52% Multiracial and 20.6% Black). Whites and Asians represented 26.1% and 1.2%, respectively (IBGE 2011a, 2011b; Cavallieri & Vial 2012).

Provided that Blacks tend to be disproportionately represented in favelas and other similar marginalized communities, they are often stigmatized and discriminated against for being both Black and *favelados(as)* 'favela dwellers' (Beaton & Washington 2014; Goldstein 2013; Perlman 2010; Roth-Gordon 2017). Elaborating on these issues, Vargas (2004: 455, quoted in Roth-Gordon 2017: 24) argues that there is a persistent association between favela and blackness. As he explains, "[u]rban space became a metaphor, a code concept for blackness, in the same way that the favela was rendered a code word for blacks." Despite this fact, many scholars who deal with favelas fail to include race/color as a significant factor in studies about these communities.

Following Omi and Winant (2007: 15), race is seen here as "a pre-eminently sociohistorical concept," and as such one can only understand how it is manifested by considering specific elements of the history and culture of a given society. For example, racial classification in Brazil is mainly based on phenotypical features, such as skin color, hair texture, and the size and shape of nose and lips. In the United States, on the other hand, racial identification is mostly defined by ancestry. In this case, having an African American ancestor usually leads to being classified as African American. Going back to a point made earlier, the idea that it is difficult to identify racial boundaries due to the high level of miscegenation or racial mixture in Brazilian society is often used to justify the omission or dismissal of race as an important element in social scientific studies, including those about favelas and language. However, as Dos Santos and Anya (2006: 40–41) remind us,

[W]hen faced with the task of defining racial boundaries and admitting our society's tremendous discrimination against those excluded from the inner sanctum of racial privilege, we inevitably fall back on the comforting myth of racial democracy and offer miscegenation and multiculturalism as definitive proof and symbols of our supposedly harmonious race relations.

Developed and popularized by Gilberto Freyre (1964), the concept of racial democracy to describe race relations in Brazilian society is based on the idea that the high level of interracial mixing among White masters and Black enslaved individuals has led to a harmonization of differences (Telles 2004: 33–35) or to a "model of racial coexistence" (Nascimento 1999: 380) where racism and racial discrimination do not exist. This view has been challenged by many scholars (e.g., Guimarães 1999; Hasenbalg 1978; Silva 1978) and the Brazilian black movements, especially after the 1950s, when a UNESCO-sponsored research led by Florestan Fernandes (1965) found that racism was widespread in Brazilian society and that racial discrimination and racial inequality were problems to be overcome (Telles 2004). Nevertheless, "while many activists and intellectuals perceive "race relations" in Brazil as a contest between two categories of people—whites and people of color—others continue to celebrate the virtues of "mixture," of both genes and cultures" (Fry 2000: 85).

As far as favela and blackness are concerned, it is equally important to think of how the associations between these two terms may also be connected with language variation and people's perceptions and attitudes about the different linguistic choices available to speakers in these marginalized communities. Just as an illustration of the complexity of

these issues, in her analysis of the relationship among race, class, and language use in Rio de Janeiro, Roth-Gordon (2017) shows that in some ways standard speech is tied to the material and symbolic power of whiteness and wealth, as opposed to nonstandard speech, which is associated with blackness, poverty, violence, and crime. This is particularly relevant to the purpose of this study, especially because the variable of postvocalic /s/ has both standard (alveolar and palatal) and nonstandard (aspiration and deletion) phonological variants (Scherre & Macedo 2000). Therefore, there is a need for more analyses about how language shapes and is shaped by the individual and group racial identities people construct and/or negotiate in these environments. Moreover, given the socioeconomic conditions that cause favelas to exist in the first place, they tend to be more ethnically and perhaps more linguistically diverse than other areas within metropolitan regions. As such, they represent rich laboratories for language variation because local linguistic features co-exist with the incoming foreign features brought by migrants from the less urbanized areas of the country.

4. Methods

The data analyzed in this study were collected in 2015 in City of God, a predominantly-black neighborhood located in the West Zone of Rio de Janeiro. As a research site, this community is particularly interesting for two main reasons. First, it challenges the official definition of subnormal agglomerate by not fitting entirely into its physical and infrastructural requirements. Second, it sheds light on some of the sociocultural aspects that seem to be the basis for how it is conceived as a favela by the general public. As discussed earlier, the stigma and discrimination faced by the residents of City of God and other similar communities in Rio de Janeiro and in other Brazilian cities are related to the perceived or imagined negative ideas associated with the people who live in these places, including working-class status, low levels of education, violence, crime, nonstandard language, and the color of their skin (Beaton & Washington 2014; Perlman 2010; Roth-Gordon 2017).

The data consist of seventeen sociolinguistic interviews with twenty-two adults,³ who were recruited using a snowball sampling technique (Milroy & Gordon 2003; Schilling 2013). The discrepancy between the number of interviews and interviewees is due to the fact that participants were interviewed in groups or in the presence of friends or family members as much as possible in order to minimize the effects of the *observer's paradox*, which states that “*we have to observe how people speak when they are not being observed*” [emphasis in original] (Labov 1972b: 113). Each interview lasted 40 minutes on average and they were recorded with an Olympus Digital Voice Recorder, model WS-331M. During the interview, a variety of topics were covered, including participants' personal and family history, their habits and leisure activities, as well as community-related issues. (See Appendix I for a copy of the interview protocol in English and a Brazilian Portuguese translation).⁴

The speakers were sixteen females and six males with ages ranging from 18 to 88 years. The gender imbalance was due to the fact that I was only able to be at the community during the day, when potential male participants were more likely to be at work or school, reflecting traditional gender roles. Following previous studies of postvocalic /s/ in Rio de Janeiro, the participants were divided into three age groups: 18–35, 36–55, and 56 and

³ This research was approved by the Institutional Review Board at Georgetown University. Protocol number 2015–0355.

⁴ The interview protocol used in this research was adapted from the one used in the Language and Communication in Washington, D.C. Project, which is managed by the Department of Linguistics at Georgetown University. A copy of it can be found in Nylund (2013: 291–292).

older. As an example of the demographic composition of relatively new urban communities like City of God, most of the younger participants (18–35 and 36–55) were born either in Rio de Janeiro city or Rio de Janeiro state. In contrast, most of the older speakers (56 and older) migrated to Rio when they were teenagers, coming from other regions, especially other parts of the Southeast and the Northeast. The participants were also asked to check one of the five racial categories used in the Brazilian census. Ten (45%) participants self-identified as *Preto(a)* ‘Black’, 10 (45%) as *Pardo(a)* ‘Multiracial’, and 2 (10%) as *Branco(a)* ‘White’. None of them selected the categories of *Amarelo(a)* ‘Asian’ or *Indígena* ‘Amerindian’. The speakers were also grouped based on the number of years of schooling they had completed by the time of the interview, yielding three subgroups (0–8, 9–12, and 12+) that correspond roughly to middle school, high school, and college.

In the process of preparing the data for analysis, each occurrence of the dependent variable of postvocalic /s/ in word-final position was collected through auditory analysis and coded as palatal ([ʃ] and [ʒ] as in *casas velhas* [kazaʒ vɛʎaʃ] ‘old houses’), alveolar ([s] and [z] as in *carros verdes* [kahuz vɛhdʒis] ‘green cars’), glottal or aspirated ([h] as in *as meninas* [ah mininaʃ] ‘the girls’), and deleted (*as meninas* [aʃ mininaø] ‘the girls’). In order to account for the social categories just presented, postvocalic /s/ was also coded for six social predictors, namely gender (male, female), race/color (Black, Multiracial, White), regional origin (Rio City, Rio State, Southeast Brazil, Northeast Brazil), age (18–35, 36–55, 56+), education (0–8, 9–12, 12+), and speaker (random effect).

Given that the different realizations of postvocalic /s/ are also phonetically influenced (Guy 1981), six linguistic predictors were included in the study. These predictors were preceding vowel (front, back, central), following sound (labial, coronal, dorsal, and pause), syllabic stress (yes, no), number of syllables (1, 2, 3, 4+), grammatical category (adjective, adverb, article, conjunction, noun, numeral, pronoun, verb), and word (random effect). Instances in which /s/ was followed by a vowel were excluded from the data, as in these cases it is categorically realized as the voiced alveolar fricative [z] due to a process of voicing assimilation. The issue of categorical assimilation was also the reason for the exclusion of cases where /s/ was followed by [s], [z], [ʃ], [ʒ], and [h]. Finally, cases where /s/ realization was not clear or audible enough to be identified were not included in the data.

The total number of tokens used in the analysis was 4804 occurrences of postvocalic /s/ in word-final position, of which 422 (8.8%) were of /s/ aspiration. The quantitative analysis of the data was carried out by using a multiple logistic regression statistical analysis in Rbrul (Johnson 2009). The goal of this statistical procedure was to employ a mixed-effects (i.e., fixed and random effects combined) model to determine the effect of the twelve independent variables on the occurrence of postvocalic /s/, focusing on aspiration as the application value. It is important to mention that the regression analysis of the data was completed in two separate runs to minimize the amount of interaction among the variables (Johnson, n.d.; Tagliamonte 2006). In the first run (Run 1), the independent variables consisted of preceding vowel, number of syllables, gender, origin, and education. In the second run (Run 2), the independent variables were following sound, syllabic stress, grammatical class, age, and race/color. Word and speaker were included in both runs and analyzed as random effects. Finally, Rbrul presents results in both log-odds and factor weights,⁵ but here I only report on the latter as they seem more useful in terms of making comparisons with the results of previous studies. I now turn to the results of the quantitative analysis of the data and the discussion of some of their implications.

⁵ One of the main differences between log-odds and factor weights refers to how the analyst interprets their results. In log-odds, 0 is neutral, such that a positive value represents a favoring effect and a negative value, a disfavoring one. Factor weights, on the other hand, work with a threshold of 0.5 between favoring (above 0.5) and disfavoring (below 0.5) effects (Johnson 2009).

5. Conditioning factors of /s/ aspiration

As mentioned in the previous section, the statistical analysis of the data was carried out by performing a multiple logistic regression using Rbrul (Johnson 2009) to determine the effect of the independent variables on the occurrence of the dependent variable of postvocalic /s/, focusing on aspiration. **Tables 1** and **2** below present the results of runs 1 and 2, respectively, ranking independent variables based on their level of significance.

For the sake of clarity and organization, in the discussion that follows I analyze and comment on the results of linguistic and social factors separately, concentrating on their statistically significant factor groups.

5.1. Linguistic factors influencing the occurrence of /s/ aspiration

The quantitative analysis of the data, whose results appear in **Tables 1** and **2** below, show that the five linguistic factor groups used in the model as fixed-effects significantly influence the occurrence of /s/ aspiration in word-final position. These factor groups were preceding vowel, following sound, syllabic stress, number of syllables, and grammatical

Table 1: Run 1 of the logistic regression analysis for /s/ aspiration.

/S/ Aspiration (Application Value)		
Input probability		0
Log likelihood		-932.781
Total N		4804
	Factor Weight	Percentage of Aspiration
Preceding vowel ($p < .001$)		
Central	.93	14% (222/1528)
Back	.76	7% (104/1505)
Front	.02	5% (96/1771)
Number of Syllables ($p < .001$)		
Monosyllable	.98	14% (302/2127)
Disyllable	.25	6% (93/1674)
Polysyllable	.19	2% (4/201)
Trisyllable	.17	3% (23/802)
Origin (Not Significant)		
Northeast	.78	17% (154/906)
Southeast	.46	7% (37/493)
Rio City	.45	7% (207/2891)
Rio State	.26	5% (24/514)
Gender (Not Significant)		
Female	.53	9% (339/3738)
Male	.46	8% (83/1066)
Education (Not Significant)		
0 to 8 years	.62	10% (164/1669)
12+ years	.44	8% (82/987)
9 to 12 years	.43	8% (176/2121)
Word (Random)		
Speaker (Random)		

Table 2: Run 2 of the logistic regression analysis for /s/ aspiration.

/S/ Aspiration (Application Value)		
Input probability		0
Log likelihood		-938.753
Total N		4804
	Factor Weight	Percentage of Aspiration
Following sound ($p < .001$)		
Coronal	.89	19% (251/1352)
Labial	.81	12% (153/1321)
Dorsal	.34	2% (15/734)
Pause	.05	1% (3/1397)
Syllabic Stress ($p < .001$)		
Yes	.69	16% (295/1844)
No	.31	4% (127/2960)
Grammatical Category ($p < .001$)		
Conjunction	.73	32% (100/308)
Article	.64	8% (51/675)
Adverb	.54	16% (77/487)
Numeral	.51	16% (35/225)
Pronoun	.44	9% (64/672)
Adjective	.44	3% (11/345)
Verb	.39	7% (25/335)
Noun	.28	3% (59/1757)
Age ($p = .01$)		
56+	.70	12% (351/2998)
18-35	.40	4% (10/274)
36-55	.38	4% (61/1532)
Race/color ($p = .02$)		
Multiracial	.70	10% (294/2893)
Black	.68	8% (125/1651)
White	.16	1% (3/260)
Word (Random)		
Speaker (Random)		

category. In the remainder of this section, I present the results related to these variables, calling attention to some of their implications.

Preceding vowel appeared in the results as the most significant linguistic factor group for the occurrence of /s/ aspiration in word-final position. Within this factor group, this variant was strongly favored by both central and back vowels, having factor weight coefficients of .93 and .76, respectively. Conversely, front vowels (.02) had a strong negative effect on /s/ aspiration. Scherre and Macedo (2000) also found similar results, even though they were looking at occurrences of postvocalic /s/ in Rio de Janeiro in both word-medial and word-final positions. In their study, vowels were divided into high front vowels and non-high front vowels. They found that the first group disfavored /s/ aspiration (.39) while the second group strongly favored it (.76). These results are expected given

the role that sound assimilation plays in the variation of consonants, especially in coda position (Scherre & Macedo 2000; Zsiga 2013). This strong correlation between central and back vowels and /s/ aspiration is also linked to a monophthongization phenomenon that is very common in Brazilian Portuguese, especially in the Rio de Janeiro dialect. As observed in the data, the palatal glide [j] is often inserted before /s/ in some word-final environments (e.g., *nós* ‘we’ [nɔjs], *vez* ‘turn’ [veis] as in ‘my turn’) as a result of epenthesis (Ferreira & Holt 2014; Perini 2002). So, to create an environment where /s/ aspiration can occur, i.e., not preceded by high front vowels, the palatal glide [j] is often deleted from falling diphthongs in syllable-coda position. One example from the data is the adjective phrase *mais barato* ‘cheaper’, in which postvocalic /s/ can be pronounced as a palatal or an alveolar if the semivowel is retained, as in [mayʒ baratu] or [mayz baratu]. However, it is more likely that the semivowel would be deleted for /s/ to be realized as an aspiration (i.e., the voiceless glottal fricative [h]), as in [mah baratu].

Following sound was the second most significant linguistic factor group for the occurrence of /s/ aspiration. Within this factor group, the results show that /s/ aspiration was more likely to occur before coronals (.89), and labials (.81). In comparison, dorsal consonants (.34) and pause (.05) had a strong negative effect on this variant. For the most part, these results confirm the findings of previous studies (Brescancini 2004; Gryner & Macedo 2000; Lucchesi 2009; Scherre & Macedo 2000), even though each of them uses a different approach to categorize following consonant, which makes it hard to make comparisons across studies. In any case, it is important to note that, while sound assimilation plays a role in how /s/ aspiration connects with the preceding vowel, distance in place of articulation seems to affect how this variable relates to the following consonant. This might explain why this variant is less likely to occur before dorsal consonants and more likely to occur before coronals and labials.

It is also important to point out the effect of pause on /s/ aspiration, especially because this variant is very unlikely to occur in such an environment. The quantitative analysis shows that /s/ aspiration is strongly disfavored by pause (.05). As Câmara Junior (1975: 41, quoted in Scherre & Macedo 2000: 58) points out, the effect of pause is similar to that of voiceless consonants and as such it would trigger the occurrence of another voiceless consonant, in this case, the voiceless alveolar fricative [s] or the voiceless postalveolar fricative [ʃ]. Scherre and Macedo (2000) also found that pause (.37) had a negative effect on /s/ aspiration.

Syllabic stress is the next most significant factor group to affect the occurrence of /s/ aspiration. The results show that this variant was favored when it occurred in stressed syllables (.69) and disfavored by unstressed ones (.31), which corroborate the results of previous studies (e.g., Gryner & Macedo 2000; Lucchesi 2009; Scherre & Macedo 2000).

Number of syllables also significantly affected the occurrence of /s/ aspiration. Within this factor group, monosyllables (.98) were the only group that positively affected this variant. Words with more than two syllables had the opposite effect, strongly disfavoring /s/ aspiration. Scherre and Macedo (2000) found similar results, even though they combined word size and syllabic stress into a single variable. They found that /s/ aspiration was strongly favored by both monosyllables (.65) and bigger words (polysyllables) with a stressed final syllable (.68). This variant was strongly disfavored by polysyllables ending in an unstressed syllable (.23). A comparable pattern was found in our data when looking at the occurrence of aspiration across numbers of syllables and syllabic stress (**Table 3**).

Table 3 shows that the percentage of /s/ aspiration is higher in smaller words than bigger ones. Yet, across all word sizes, except for those with four syllables or more, this variant occurs twice as much in stressed syllables than unstressed ones. These results

Table 3: Cross-tabulation of aspiration across syllable structure and stress.

Stress	Syllable Structure (Number of Syllables)				Total Tokens
	One	Two	Three	Four+	
Unstressed	7% (50/669)	4% (54/1360)	2% (19/738)	2% (4/193)	2960
Stressed	17% (252/1458)	12% (39/314)	6% (4/64)	0% (0/8)	1844

show that there is a strong connection between /s/ aspiration and stress in that stressed syllables tend to work as triggers for aspiration.

Grammatical category was the last factor group to significantly affect /s/ aspiration. Out of the categories considered for this group, conjunctions (.73), articles (.64) and adverbs (.54) had a positive effect on /s/ aspiration while nouns (.28) had a negative effect on it. This variant was slightly disfavored by pronouns (.44), adjectives (.44) and verbs (.39). Numerals (.51) had a neutral effect on /s/ aspiration. Comparatively, out of the grammatical categories included in Scherre and Macedo's (2000) study, only conjunctions and adverbs (.54) had a slight favoring effect on /s/ aspiration. The remaining categories had either a minor negative effect (proper nouns (.35), verbs (.37), and numerals (.38)) or a neutral effect (common nouns (.49) and adjectives (.51)). These results are expected given the fact that postvocalic /s/ variation in Brazilian Portuguese involves both phonological and morphological elements. For example, the positive effect of articles on aspiration, in which case postvocalic /s/ represents the plural marker -s, has to do with the number agreement rules in noun phrases, especially in nonstandard or popular varieties of Brazilian Portuguese. In these varieties, speakers tend to keep the plural morpheme -s (or one of its variants) in the first element or in the leftmost position of a noun phrase (Guy 1989; Guy & Zilles 2008), which is the position usually occupied by articles and other determiners. The fact that articles are usually followed by other words (nouns, pronouns, adjectives, etc.) helps to understand why aspiration is unlikely to happen before pause. In other words, aspiration does not stand alone as the last sound in a phrase or sentence; it needs to be followed by a consonant, most probably a voiced one. Having discussed the effect of the linguistic factors on /s/ aspiration in this section, I now turn to a discussion of the social factors that influenced the appearance of this variant in our data.

5.2. Social factors influencing the occurrence of /s/ aspiration

The quantitative analysis of the data included six social factors, namely race/color, origin, age, gender, education, and speakers (as a random effect). Out of these variables, only age and race/color were selected as significant to the occurrence of /s/ aspiration and so I comment on their respective influence in the remainder of this section.

Age was the most significant social factor to influence the occurrence of /s/ aspiration. Out of the age groups considered in the analysis, speakers who were 56 years old and older (.70) strongly favored it. The two younger groups, composed of people who were between the ages of 18 and 35 (.40) and 36 and 55 (.38), had a slight disfavoring effect on this variant. It is also important to mention that the percentage of use of /s/ aspiration by the older group (12%) was almost three times as high as that of the younger group (4%) or the middle-aged group (4%). As aspiration is a nonstandard variant of postvocalic /s/, looking at how these results relate to the education level of the interviewees might provide some important insights in this regard. **Table 4** (below) shows a cross-tabulation of the use of aspiration across age groups and level of education.

First of all, it is important to note that none of the participants from the younger group (18–35) had less than eight or more than 12 years of education. One of the reasons for

Table 4: Cross-tabulation of aspiration across age and level of education.

Education (years)	Age Groups			Total Tokens
	18–35	36–55	56+	
0–8	0	7% (8/108)	10% (156/1588)	1696
9–12	3% (10/274)	3% (43/1212)	19% (123/635)	2121
12+	0	5% (10/212)	9% (72/772)	987

the difficulty of finding speakers to fill these cells is the fact that access to basic education has had a relative increase in the last few decades, giving people more opportunities to attend school, especially in urban settings. The expansion of public universities and the availability of government-subsidized scholarships in private universities have also contributed to improving the number of people who have completed an undergraduate degree, but there is a lot to be done to make higher education equally accessible for all. Regardless of these facts, aspiration represented only 3% of the realizations of postvocalic /s/ produced by the younger group. Looking at the overall figures for the two older groups, one notices that there is an increase in the percentage of aspiration from the middle-aged to the older group, in all levels of education. These results do not confirm those found by Gryner and Macedo (2000), who collected data from three age groups (13–30, 31–50, 51–70) from Cordeiro in the northern part of the state of Rio de Janeiro between 1975 and 1978. They found that the younger group (.62) favored aspiration while the middle-aged (.47) and the older group (.41) disfavored it. One explanation for this discrepancy might be the fact that Gryner and Macedo used data from teenagers, who might not have felt the social pressure often associated with more education and/or participation in the job market (Auler 1992; Eckert 1997). In any case, the expectation is that the use of aspiration and other nonstandard features will disappear from the speech of the younger generations, caused by their advancement in education (Guy & Zilles 2008).

Within the race/color factor group, /s/ aspiration was favored by both Multiracial (.70) and Black speakers (.68). White speakers (.16) strongly disfavored this variant. These results indicate a possible connection between racial or color identity and the use of /s/ aspiration in the City of God community. In our data, there were only 3 occurrences (1%) of /s/ aspiration produced by White speakers, which means that this variant was mostly used by both Multiracial and Black individuals. Even considering that only two people self-identified as White among the interviewees, it is interesting to think of some of the reasons these speakers did not use /s/ aspiration as much as the rest of the group. Given the lack of studies that have focused on the relationship between race/color and sociolinguistic variation in Brazil, it is difficult to arrive at a satisfying answer, but I would go so far as to speculate that the contrast in the use of /s/ aspiration has to do with its nonstandard status in Rio de Janeiro society. Following Roth-Gordon's (2017) finding that in Rio de Janeiro standard speech is associated with whiteness and nonstandard speech is associated with blackness, it is possible that in such a racially-stratified society speakers may be using linguistic features, including the different variants of postvocalic /s/, to show their affiliation (or distance) to some racial groups and not others (Rickford & McNair-Knox 1994; Schilling 2004).

6. Final considerations

The goal of the present paper was to provide an updated sociolinguistic analysis of word-final postvocalic /s/ in Brazilian Portuguese, with a focus on its aspirated variant, realized as the voiceless glottal fricative [h]. The study looked at the linguistic and

social conditionings of this variant in the speech of individuals and groups from City of God, a predominantly-black neighborhood regarded as a favela in Rio de Janeiro. This demographic aspect of the study is extremely relevant given the fact that this is one of a few sociolinguistic studies and perhaps the only variational study to include race/color as an important social factor in its analysis.

The data analyzed in the study consisted of seventeen interviews collected in the summer of 2015 with twenty-two City of God residents, stratified by race/color, age, level of education, and regional origin. There was a total of 4804 tokens of word-final postvocalic /s/ in the data, of which 422 (8%) were of /s/ aspiration. The quantitative analysis of the data selected as significant for the occurrence of /s/ aspiration all the linguistic variables included in the study, namely preceding vowel, following sound, syllabic stress, syllable structure, and grammatical category. Out of the social factors included in the investigation, only age and race/color significantly affected the occurrence of the analyzed variant. Word and speaker were both included in the quantitative analysis as random effects.

An important aspect of this investigation was the discussion about the understudied relationship between language and racial identity in Brazil, especially in favelas. Given the connections among favela, nonstandard language behavior, and blackness (Roth-Gordon 2017), the present study stresses the need for more investigations that help to understand the nuances of these intersections. The importance of examining the role of racial identity in studies about favelas and other similar communities is justified by the fact that Afro-Brazilianess is not only a visible aspect of the skin color of their residents but also a defining element of the various cultural manifestations produced in these places.

Even though this study contributes to the understanding of how language shapes and is shaped by social identity, it is important to point out that this is just an initial step toward a more comprehensive examination of how language in general, and postvocalic /s/ in particular, is used in these highly-populated urban communities. As a suggestion for future investigations, Brazilian Portuguese studies would benefit a lot from the adoption of second and third wave approaches to variation study (Eckert 2012). A limitation of this and many other language variation studies in Brazil is that they have not been successful in exploring other dimensions of language variation and change. At least within the study of postvocalic /s/ sociolinguistic variation, the impact of changes in style (Labov 1972a), in audience (Bell 1984, 2001), and topic (Rickford & McNair-Knox 1994) are still understudied. Therefore, there is a long way to go so that sociolinguistic variation studies in Brazil can go from providing a general picture about a certain language variation phenomenon to incorporating more situated analyses, complemented by rigorous ethnographic fieldwork. As the field evolves in this direction, discussions about identity will consequently be able to explore and capture the dynamic and changing nature of this social construct in interaction.

While all these adjustments are made, scholars concerned with the intersections between language and racial identity need to come up with better ways to account for race/color, especially in the case of Brazil, where the idea of racial difference in sociological terms is still questioned and/or dismissed by a considerable part of the population. However, the notion of a post-racial or racially harmonious society has been challenged for a long time by the Brazilian Black movements, more so in recent years due to the multiplication effect of social media. As a result of this ongoing struggle, in recent years, there has been an increase in the number of Brazilians who self-identify as Multiracial and Black and a decrease in the number of Brazilians who self-identify as White (IBGE 2018). These changes in identity are connected with a new and noticeable black aesthetics, which is expressed and reinforced by how an increasing number of people are taking pride in the color of their skin, their natural hair, and their African-themed clothes. It is going to be interesting to see how language will be used to convey all of these new meanings.

Additional File

The additional file for this article can be found as follows:

- **Appendix I.** Interview protocol. DOI: <https://doi.org/10.5334/jpl.205.s1>

Competing Interests

The author has no competing interests to declare.

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