

# **To Voice, or Not to Voice: The Pronunciation of the Voiced Variant [z] of the Inflectional –s Endings by Speakers of American English in Three Speech Types**

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## **Abstract**

This study investigates the pronunciation of the voiced variant [z] of the inflectional –s endings in three speech types: spontaneous speech, memorized speech, and read speech. Almost six hundred tokens of the targeted variable (z) were collected from political news from two American News channels to see whether they were voiced in accordance with the morphophonemic descriptions of this inflectional ending in linguistic textbooks, or were they devoiced due to the phonetic environment and speech types. It was found that the voiced variant of the inflectional –s endings was not always voiced in actual speech. Both the phonological and sociolinguistic factors affected its realization. For the phonological context, the less sonorant the adjacent segment is, the more devoicing occurs. Furthermore, it is devoiced more often at the end of a larger prosodic domain. Speech types also affected the degree of voicing in that devoicing occurred the most in spontaneous speech (70.7%) more in memorized speech (64.6%), and occurred the least in read speech (51.3%). In other words, higher degree of attention to speech (in the Labovian sense) results in less devoicing of the voiced variant of the inflectional –s endings. Thus, when speakers are speaking more spontaneously, more devoicing takes place.

**Keywords:** inflectional –s endings, pronunciation, language in use, American English

## **1. Introduction**

The morphophonemic rules for the realizations of English inflectional –s endings as described in many linguistics and EFL textbooks seem quite straightforward. Taking away the formal representations and complicating notations of various frameworks, it boils down to this: the –s ending is pronounced [ɪz] or [əz] when it follows a sibilant ([s], [z],[ʃ], [ʒ], [tʃ], [dʒ]); it is voiced [z] after all voiced sounds except sibilants; it is voiceless [s] after all voiceless sounds except sibilants (Celce-Murcia, Brinton, Goodwin, & Griner, 2013; Davenport & Hannah, 2010; Fromkin, Rodman, & Hyams, 2014). Although this may be an accurate description of the inflectional –s endings in the citation form as pronounced by native speakers of English, the question remains whether and to what extent this is true for its occurrence once in use. Taking into consideration that there is a tendency toward word-final obstruent devoicing in English, it seems likely that one of these rules –the rule indicating

that the inflectional –s ending is realized as voiced when following a non-sibilant voiced segment– may not be fully observed in practice.

Since there are many types of speech in context, there is a possibility that different speech types may also affect the pronunciation of the voiced variant [z] of the inflectional –s endings differently. Thus this variant could be considered a variable (z) which may be voiced or devoiced in different contexts in actual use. This study, therefore, investigates the pronunciation of this particular variable in three speech types: spontaneous speech, memorized speech, and read speech (as characterized by Goffman, 1983).

## 2. Inflectional –s endings

In English, there are eight regular morpho-phonological inflections. Three of these inflections share the same set of phonetic realizations. They are the third-person singular present tense, the possessive marker, and the plural marker (Celce-Murcia et al., 2013). These endings are referred to collectively as the inflectional –s endings. Examples of the realizations of these rules are provided in the following table adapted from the one provided by Celce-Murcia et al. (2013, p. 395).

Table 1

*Pronunciation of inflectional –s endings in English*

inflectional –s endings	1	2	3
	[əz], [Iz]	[z]	[s]
Third-person present	push <u>es</u> wash <u>es</u>	cri <u>es</u> say <u>s</u>	pick <u>s</u> hop <u>s</u>
Possessive	Josh' <u>s</u> Mr. Peech' <u>s</u>	Jenny' <u>s</u> Ron' <u>s</u>	Janet' <u>s</u> Mrs. Cape' <u>s</u>
Plural	house <u>s</u> garage <u>s</u>	toy <u>s</u> bed <u>s</u>	coat <u>s</u> cake <u>s</u>

The focus of this study is on the second rule –the rule indicating that the inflectional –s endings are realized as [z] when the preceding segment is a voiced sound- to see whether and to what extent this rule is observed by native speakers of American English in real use. There are two reasons for choosing to investigate this particular rule. The first reason is due to the fact that for the laryngeal feature [voice], being ‘voiceless’ is unmarked, while being ‘voiced’ is marked (Ohala, 1983, pp. 194-202; Wetzels & Mascaro, 2001); and that this is especially the case for fricatives, in comparison to stops (Ohala, 1983). As Ohala (1997, p.98) notes, “whereas an estimated 24% of the world’s languages have only voiceless stops, some 38% have only voiceless fricatives”. Based on the aerodynamics principals of phonetics, Ohala (1997) explains that it is much harder to voice fricatives as frication requires a high degree of air pressure, whereas, voicing requires the opposite.

The second reason is that it has generally been observed that voiced obstruents (stops and fricatives) seem to be devoiced in the word-final position. These two reasons led to a suspicion that this voicing rule of the inflectional –s ending might not be observed or fully observed in real language use, even by native speakers of English (noted that the same concern has also been expressed by Ohala (1983)) as the [z] of the inflectional –s ending is a voiced fricative as well as a voiced obstruent which occurs in the final position.

### 3. Final Obstruent Devoicing

The term ‘devoicing’ refers to the state of having little or the lacking of vocal folds vibration (Verhoeven, Hirson, & Basavaraj, 2011). The final obstruent devoicing rule has been witnessed in many languages i.e. in German and Dutch (Brockhaus, 1991; Grijzenhout, 2000). In German, if an obstruent is in the syllable-final or word-final position, it is always devoiced (Grijzenhout, 2000). A similar rule is evident in Dutch, where obstruents in the word-final position are always devoiced (Grijzenhout, 2000; Wetzel & Mascaro, 2001).

However, not all languages in the world adopt this rule. Languages not adopting this rule include, among others, Yiddish (hoy[z] ‘house’), Berber (igm[z] ‘cap’) and English (skrai[b] ‘scribe’) (Grijzenhout, 2000; Wetzel & Mascaro, 2001) since the final obstruents are still voiced. Despite the fact that these languages do not strictly adopt this rule, the word-final obstruent devoicing phenomenon has still been observed. The tendency for the occurrence of such phenomenon is evident even in the speech of young L1 English-speaking children (Smit, 1993), L2 speakers of English (Peng & Ann, 2004), and in disordered speech (Archambault & Bergeron, 1990). For the English language in particular, it has been suggested that voiced obstruents tend to be devoiced in the word-final position. This phenomenon is also evident in many varieties of English including American English (Davenport & Hannahs, 2010), African American English (Thomas, 2007), Liverpool English (Watson, 2007), and Maori English (Holmes, 1996).

### 4. Word-final fricative devoicing in American English

In American English, word-final obstruents normally undergo the devoicing process, and that this is especially the case for word-final voiced fricatives (Davenport & Hannahs, 2010; Kenyon, 1950; Smith, 1997). With regard to the potential causes of such devoicing, three factors have been proposed to account for the degree of devoicing of the word-final fricatives, which are, fricative-inherent factors, phonological context, and sociolinguistic factors (Verhoeven et al., 2011). Among these three factors, phonological context has been claimed to increase the degree of devoicing the most (Verhoeven et al., 2011): That voiced fricatives are devoiced more at the end of a larger prosodic domain (i.e. sentence) than at the end of a smaller prosodic

domain (i.e. word-final position *within* a sentence). Devoicing is also affected by the assimilation process: In local context, voiced fricatives are suggested to be fully voiced only when placed between voiced segments (Davenport & Hannahs, 2010); and according to Docherty, Haggard and Stevens (as cited in Smith, 1997) the voiced fricative /z/ is somewhat devoiced when following a voiced segment, and devoiced more when following a voiceless segment.

A laboratory study by Smith (1997) dealt especially with the issue of the devoicing of the voiced alveolar fricative /z/ in the word-final position by native speakers of American English. Smith compared the phonemic word-final voiced fricative /z/, (i.e. [reɪz] ‘raise’) with instances of the voiced variant [z] of the inflectional –s endings (i.e. [reɪz] ‘rays’) before concluding that there was no difference in pronunciation between the phonemic /z/ and the morphophonemic [z] (see also Saito, 1994). He then investigated the pronunciation of the voiced fricative /z/ in various circumstances. The finding revealed that in terms of ‘local context’, or phonological context adjacent to the voiced alveolar fricative /z/, the /z/ is partly or wholly devoiced in all circumstances except for when it occurred between vowels or sonorants. In other words, both the preceding and following segment affect the voicing of the word-final voiced fricative /z/. In terms of prosodic context or ‘phrasal context’, Smith (1997) suggested that the voiced fricative tended to devoice more often when occupying the position at the end of a larger prosodic domain (or a sentence) than in a smaller domain (i.e. a word-final position *within* a sentence).

Though the study by Smith (1997) shed light into the issue of the devoicing of the voiced alveolar fricative /z/ and the voiced variant [z] of the inflectional –s endings in American English, certain concerns exist with regard to the methodology of his study. The first concern is related to the number of participants. The study used speeches from only four participants (two males, two females): The number of which is considered quite small to make any valid generalizations with regard to the effect of local and phrasal context on the devoicing of variable in question, although the number of tokens collected (439 in total) does make the finding somewhat more reliable. The second, more important concern, however is related to the type of data used. Smith (1997) used invented meaningful sentences instead of naturally occurring language. The participants repeated the same sentences several times during the data collection procedure. Such data is experimental in nature and has to be differentiated from naturally occurring language. This concern was also explicitly expressed by Hewings (1998) in his study looking at intonation choices in English used by non-native English speakers from various first language backgrounds. Upon claiming that decontextualized utterances could provide insight into intonation in citation form, Hewings considered it a more proper approach to elicit *contextualized* data, as subjects would be engaged in a “purposeful interaction with a hearer against a context-specific background of shared assumptions” (p.

321). These concerns together with the intention to investigate the pronunciation of the voiced variant of the inflectional –s endings in American English and the potential for this variable to be differently devoiced in different local and prosodic contexts led to the first research question of this study: to what extent is the voiced variant [z] of the inflectional –s endings devoiced in different local and prosodic contexts in American English?

## 5. Linguistic variation and speech type

Apart from fricative inherent factors and phonological contexts, another type of factor which is suggested to affect the pronunciation of linguistic variable are sociolinguistic factors. Sociolinguistic research has found that many factors can account for linguistic variability in people's speech. Some of these factors are found to be associated with certain groups of people (e.g. gender, socioeconomic class), other factors are those which affect how speakers change their speaking style (e.g. attention-to-speech, type of audience, topic of the speech) (Bell, 1984; Craig & Grogger, 2012; Labov, 1966, 1972; Trudgill, 1972, 1974).

One area which is of interest to sociolinguists is the potential effect of speech situation on speech style. Recent research has confirmed the robust relationship between different speech situations and phonetic variations by the speakers. In other words, these research have studied language use in different speech situations (e.g. TV commentaries, face-to-face interview, read aloud stories) and found that certain linguistic variations occur more in certain types of talks (Brognaux & Drugman 2014; Brouwer, Mitterer & Huettig, 2010; Erntus, Hanique, & Verboom, 2015; Hanique, Ernestus, & Schuppler, 2013).

Warner and Tucker (as cited in Ernestus et al., 2015) found that the reduction of flaps and stops in American English occur most in telephone conversations between adults who know each other, less in read aloud stories, and least in word-list reading. Hanique et al. (2013) investigated the reduction of prefixal schwa and final /t/ in Dutch past participles from three speech components in the Ernestus Corpus of Spontaneous Dutch and the Spoken Dutch Corpus and found that the reduction of prefixal schwa and final /t/ occurred in high degrees in informal speeches (i.e. conversational speech, TV interviews) than in formal ones (i.e. read speech). Ernestus et al. (2015) investigated two questions in their studies: in the first study, they explored Dutch polysyllabic content words which are normally reduced in casual speech in the Spoken Dutch Corpus and found that unscripted speech favor reduction more than scripted speech, and spontaneous speech in informal settings favor reduction more than ones in formal settings; in the second study, they studied the reduction of prefixal shwa and final /t/ Dutch past participles in their participants' elicited shadowed speeches. The participants were told to shadow two recordings: the carefully articulated one (fewer reduced variants) and the casually articulated

one (more reduced variants). The results show that participants shadowed casually articulated speech very similarly to when they shadowed carefully articulated speech (i.e. very few reduced variants). The researchers concluded that participants responded more to the formality of the recording setting than the stimuli; in other words, people respond to setting by adapting their language usage.

Previous studies showed that different speech situations affect phonetic variation differently. Though the speech situations investigated in each of the mentioned study seem to vary greatly, the general trend is that phonetic variation is found more in spontaneous speech, or speech in informal situations, than in read speech or speech in formal situations. As this study aims to investigate the pronunciation of the voiced variant [z] of the inflectional –s endings in American English, it was considered appropriate to investigate this question by exploring the pronunciation of the targeted variable in real language used in different speech situations. The speech categorization suggested by Goffman (1983) was adopted as the framework for this study. According to Goffman, speech can be categorized into 3 types: spontaneous speech, memorized speech, and read speech. As it is also considered that speeches by news reporters should represent “standard” speech in use, this study used data from the speeches in 2 American news channels as they are examples of real language use in context.

## **6. Research questions**

Due to the possibility of devoicing as reviewed above, this study addresses the following questions:

**6.1** To what extent is the voiced variant [z] of the inflectional –s endings devoiced in different local and prosodic contexts?

**6.2** To what extent is the voiced variant [z] of the inflectional –s endings devoiced in different speech types?

## **7. Methodology**

Tokens of the voiced variant [z] of the inflectional –s endings in speeches involving politics produced by male speakers in 2 major American news channels, namely FOX news and ABC News, between October 2015 and November 2015 were collected for investigation. Approximately 100 tokens of the voiced variant [z] from each speech type from each news channel from online clips were collected, making a total number of approximately 600 tokens of the targeted variable used in this study. Speeches that were categorized as spontaneous speeches were political discussions. Speeches which were categorized as memorized speeches were speeches produced by news reporters as they had to memorize what they had to say before retelling their stories in front of the camera. Read speeches were from news scoops that were read like

reports without the presence of a reporter. Ideally, it would be preferable to collect data from the same speakers in the three types of talk. However, as it was not the nature of people working in this field to perform more than one duty (e.g. reporter, interviewer, and discussant) this is the compromise we had to make in collecting real language in use. The data was gathered from approximately 30 male speakers. The exact number of speakers could not be pinpointed due to the fact that the faces of the speakers of some of the read speeches from the news scoops were not seen.

Two raters independently transcribed each token of the targeted variable. The raters were two Thai graduate students, one majoring in English Linguistics and the other in Linguistics. Both have adequate background in phonetics and phonology and have no problem distinguishing between the voiced and the voiceless alveolar fricatives. Tokens were wholly or partially devoiced were transcribed as [s], and tokens that retained the voiced nature of the voiced variant were transcribed as [z]. The raters listened to each token as many times as they needed. If any disagreement in transcribing occurred, they rechecked the tokens together and came to an agreement. Each transcription was noted together with its ‘local context’ and ‘prosodic context’. Local context refers to the phonetic environment where the variable occurs; in other words, the phonetic element preceding and following the segment in question. Prosodic context refers to the position of each voiced variant in the larger prosodic domain: whether the token is at the end of a thought group (i.e. at the end of the larger prosodic domain), or in a medial position within a thought group (i.e. at the end of the smaller prosodic domain).

## **8. Findings and discussion**

The findings are shown below in table forms along with explanations and discussions. It should be noted that deletion of the inflectional –s endings did not occur in the data. The morpheme still remains despite the lack of voicing.

### **8.1 Devoicing in phonological context**

The following part answers the first research question: To what extent is the voiced variant [z] of the inflectional –s endings devoiced in different local and prosodic contexts?

## 8.1.1 Devoicing in local contexts

Table 1

*Devoiced percentages of the voiced variant [z] of the inflectional –s endings in different local contexts by speech types*

Speech type	Local context											
	V_V	V_S	V_Vo	V_Vl	S_V	S_S	S_Vo	S_Vl	Vo_V	Vo_S	Vo_Vo	Vo_Vl
Spon.	33.3	40	37.5	71.4	31.2	50	50	72.4	72.4	/	100	87.5
Memo	21.4	/	0	66.7	29.8	52.6	0	69.7	50	100	0	100
Read.	0	11.1	0	50	18.8	41.7	33.3	51.7	27.3	50	/	100

‘V’ for ‘vowels’

‘S’ for ‘sonorant consonants’

‘Vo’ for ‘voiced obstruents’

‘Vl’ for ‘voiceless obstruents’

‘/’ for ‘lack of data’

‘\_’ for ‘the position of the voiced variant /z/’

‘Spon.’ for ‘spontaneous speech’

‘Memo.’ for ‘memorized speech’

‘Read.’ for ‘read speech’

Starting from the devoicing of the voiced variant [z] of the inflectional –s endings in different phonetic environments, it can be seen that the less sonorous the following segment is, the higher the percentage of devoicing of the voiced variant /z/ preceding it. “Sonority” refers to the loudness of sound “relative to that of other sounds with the same length, stress, and pitch” (Ladefoged & Johnson 2011, p.245). With everything being equal, vowels are the most sonorous sounds followed by glides, liquids, nasals, voiced fricatives, voiceless fricatives, voiced stops, and voiceless stops (Davenport & Hannahs 2010). From our data, the fact that sonority affects voicing is evident in all speech types, regardless of the preceding segment. The only exceptions were in ‘Vo\_Vo’ and ‘Vo\_Vl’ position in spontaneous speech. However, this can be explained as resulting from the very limited number of tokens available in both positions. Thus, this finding is in line with what has previously been suggested by Smith (1997) concerning the voicing and devoicing of the phonemic /z/: that the following segment affects the voicing of the voiced fricative /z/ in that the voiced fricative /z/ would be devoiced most when preceding a voiceless segment; and that the less sonorous the following segment is the more devoiced the voiced fricative /z/ preceding it would become. In addition to the effect of the following segment on the devoicing rates of /z/ as suggested by Smith (1997), it was found in this study that the effect of having sonorant or voiced segment as the following segment was very similar. This can be seen by comparing the devoiced percentages of the voiced variant /z/s in ‘V\_S’ and ‘V\_Vo’ position and in ‘S\_S’ and ‘S\_Vo’ position in all speech types. Therefore, the devoicing of the morphophonemic [z] of the inflectional –s

endings works the same way. Without a doubt, assimilation also plays a role in the devoicing of this inflection as the variable becomes devoiced more when followed by a voiceless sound.

In terms of the effect of the preceding segment on the voicing of the voiced variant [z] of the inflectional –s endings, it can be seen from Table 1 that the less sonorous the preceding segment is the more devoiced the [z] will become. This is also in line with what has been suggested by Smith (1997) concerning the phonemic /z/. Additionally, the results also show that devoiced percentages of the voiced variant [z] were similar when a vowel or a sonorant consonant is the preceding segment, for example, the devoiced percentage is 33.3% in the local context of V\_V (in the intervocalic position), is 31.2% in the context ‘S\_V’, and is 72.4% in the context ‘Vo\_V’ respectively. This type of finding was not observed in Smith’s (1997) study.

### 8.1.2 Devoicing in prosodic contexts

Table 2

*Devoiced percentages of the voiced variant [z] of the inflectional –s endings in different prosodic contexts by speech types*

Speech type	Prosodic context (position in a thought group)	
	At the end of a thought group	In the medial position*
Spon.	85.2	56.2
Memo.	85.7	43.4
Read.	66.7	35.9

*Note.* \* refers to the ‘percentage calculated with the exclusion of data in three local contexts, namely ‘V\_S’, ‘Vo\_S’ and ‘Vo\_Vo’ positions where data was lacking’

Table 2 shows the percentages of devoiced [z] in different prosodic contexts: the medial position within a thought group, and the position at the end of a thought group. However, as it can be seen from Table 1 that tokens of the voiced variant [z] of the inflectional –s endings were lacking in some local contexts in some speech types (i.e. ‘V\_S’ position), in order to yield most accurate results, only the local contexts which data was available were included in the calculation of the overall local context devoiced percentages. This ruled out three local contexts which lacked data in at least one of the speech types, namely ‘V\_S’, ‘Vo\_S’ and ‘Vo\_Vo’ local contexts. The devoiced percentages of

the voiced variant [z] tokens with the asterisk (\*) indicate the percentages derived from such calculation.

In terms of the effect of different prosodic contexts on the voicing of the voiced variant [z] of the inflectional –s endings, the data from Table 2 suggests that the voiced variant [z] is devoiced more when occupying positions at the end of a thought group. This suggestion is borne out in all three speech types. The results support the claim made in Smith's (1997) study which suggested that the voiced fricative /z/ tends to be more devoiced when occupying the position at the end of the larger prosodic domain.

However, it should be noted that none of the percentages reached a hundred percent devoiced rate in any speech type as suggested by Smith (1997) that the voiced fricative /z/ will always be completely devoiced when occupying the sentence-final position (p. 488). One explanation concerns the methodology of Smith's work. It is suspected that the tokens investigated were too few. Another proposed explanation is that though both the sentence-final positions, as investigated by Smith, and the positions at the end of a thought group, as investigated in this study, are positions at the end of the larger prosodic domains, they are by no means the same and do not share all characteristics. One thing which should be noted is that the sentence-final position as investigated in Smith's study is at the end of a sentence which meaning did not relate with that of the next sentence. It is suspected that because of this, the speakers stopped *completely* before beginning reading the next sentence. This was not the case for the positions at the end of a thought group investigated in this study: the positions at the end of a thought group as investigated in this study were many times followed by only small pauses and the speakers said other things shortly afterwards as people normally do in situations of real language in use.

## 8.2 Devoicing in different speech types

This part answers the second research question: To what extent is the voiced variant [z] of the inflectional –s endings devoiced in different speech types?

Table 3

*Devoiced percentages of the voiced variant [z] of the inflectional –s endings in all contexts by speech types*

Speech type	Devoiced percentages in all contexts
Spon.	70.7
Memo.	64.6
Read.	51.3

Data from Table 3 clearly shows that the voiced variant [z] of the inflectional –s endings were devoiced by 70.7% in spontaneous, 64.6% in memorized, and 51.3% in read news or read speeches. This demonstrates that this variant is devoiced at a very high percentage even when they are produced by speakers in a very formal setting talking about a serious topic (politics) in the media. Moreover, the 20% difference in devoiced rates in spontaneous speech and read speech clearly suggests that devoiced variants are found more in spontaneous speech than in read speech.

As the voiced variant [z] of the inflectional –s endings is devoiced the most in spontaneous speech, less in memorized speech, and least in read speech, we may ask what factor accounts for this tendency in devoicing. Provided that the formality level of the setting, topic of speech, particular types of audience for each news channel, gender of the speakers were held constant, we suggest that the factor which accounts for the difference in devoicing rates in these different speech types is the psychological factor ‘attention-to-speech’ as suggested by Labov (1972, p. 99). According to Labov, speakers shift style according to how much attention they pay to speech and how much they monitor their talk. The least amount of attention paid to speech, the more casual the speaker will sound. As read speech requires the highest amount of attention to forms, memorized speech requires less attention and spontaneous speech requires the least, the notion of attention-to-speech suggested by Labov (1972) is highly likely the explanation for the question why the devoicing of the variant [s] was found more in spontaneous speech of political discussions, less in memorized speech of news reports, and least in read speech of news scoops. For speakers are more engaged the content of the talk while they participate in the discussion and focus more on the form of the language as they read from a script.

Despite the shifted trend in sociolinguistics and social psychology to study the effect of the types of audience on style-shifting (Bell, 1984, 2001; Muir, Joinson, Cotterill & Dewdney, 2017), ‘Speaker Design’ (Hernández-Campoy & Cutillas-Espinosa, 2012; Schilling-Estes, 2002; Soukup, 2012) and the current interest in the social constructionist approach which highlights how an individual can purposely use a range of stylistic choices to project the identity one wants to be perceived by others (Drager, 2015), studies such as this one demonstrates that the idea of style-shifting due to speech types as a result from the psychological factor of “attention-to-speech” should not be ruled out.

## **9. Recommendations for further Research and Pedagogical Implications**

As this study focuses on the pronunciation of the inflectional –s endings in American English, it would be interesting to know how much and to what extent the phenomenon occurs in British and other varieties of English? Does the inflectional -s get devoiced at a similar rate? Looking at different types of talks or genre other than news reports, such as public lectures, talk shows, or natural

conversation should give us more insight into the phenomenon. If possible the formality of the situation can also be investigated to see whether they would affect the devoicing rate or not while making sure that the level of attention to speech remains constant. Since this study only used the speech of male participants, it would also be interesting to see whether males and females have similar realizations of this token. Also, would we obtain a similar result for the –ed past tense endings? How would stops behave similarly to or differently from fricatives?

As for the pedagogical implications, teachers of English should be aware of how the pronunciation rule of the inflectional –s ending is observed in actual talk by native speakers of English. Contrary to the simple explanation of the inflectional –s endings in the citation form, many instances of this variant will be partly or wholly devoiced in connected speech. The inflectional –s ending is devoiced 70.7% of the time in spontaneous speech and 64.6% of the time in memorized speech. Even in read speech, this variable is devoiced up to 51.3% of the time. Teachers should keep this in mind when they teach and evaluate the pronunciation performance of their students. If students were to devoice the voiced variant of the inflectional –s endings in certain contexts, teachers should realize that this is in line with what native speakers normally do and perhaps not grade students so harshly or to try to “fix” students’ pronunciation so that it “fits” the rule. After all, it is a descriptive rule that captures the generalization of the inflectional ending in its citation form.

## **10. Conclusion**

From the study, it can be seen that unlike the rules that has been described in textbooks, that English inflectional –s endings will be realized as the voiced variant [z] when following a voiced non-sibilant segment is not fully observed in American English in actual use. At least two factors affect the devoiced rate of this variant: Phonological contexts and speech types. For the phonological context, both the local and prosodic context affect the voicing of the voiced variant [z]. In terms of the local context, the less sonorous the following segment is, the more devoiced the voiced variant [z] would become. The same is true for the preceding segment: the less sonorous the preceding segment is, the more devoiced the following voiced variant [z] would become. Additionally, sonorant consonants and voiced obstruents have similar effect on the voicing of the voiced variant [z] when they are the following segment; vowels and sonorant consonants have similar effect on the voicing of the variable when they are the preceding segment. For the effect of prosodic context, the results show that the voiced variant [z] of the inflectional –s endings, when occupying the position at the end of a larger prosodic domain (i.e. the position at the end of a thought group), tends to be more devoiced than when occupying the position at the end of a smaller prosodic domain (i.e. positions within a thought group).

The voicing of the voiced variant [z] of the inflectional –s endings is also affected by speech types in that the voiced variant [z] is devoiced most often when occurring in spontaneous speech, less in memorized speech, and least in read speech.

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