

Research Questions

Which distortions are most common in people with aphasia resulting from left hemisphere stroke? Which syllable position (onset, nucleus, coda) is most frequently affected by distortions?

Background

Perceptually salient speech sound production errors are common in aphasia (Blumstein 1973) and they can be classified and analyzed in a variety of ways. Errors classified as “substitutions” give the perceptual impression that the speaker has selected or accessed incorrect phonemes and articulated these normally. In contrast, errors classified as “distortions” imply that the correct phoneme was accessed, but articulated in an imprecise or unusual way (Cunningham, Haley, and Jacks 2016).

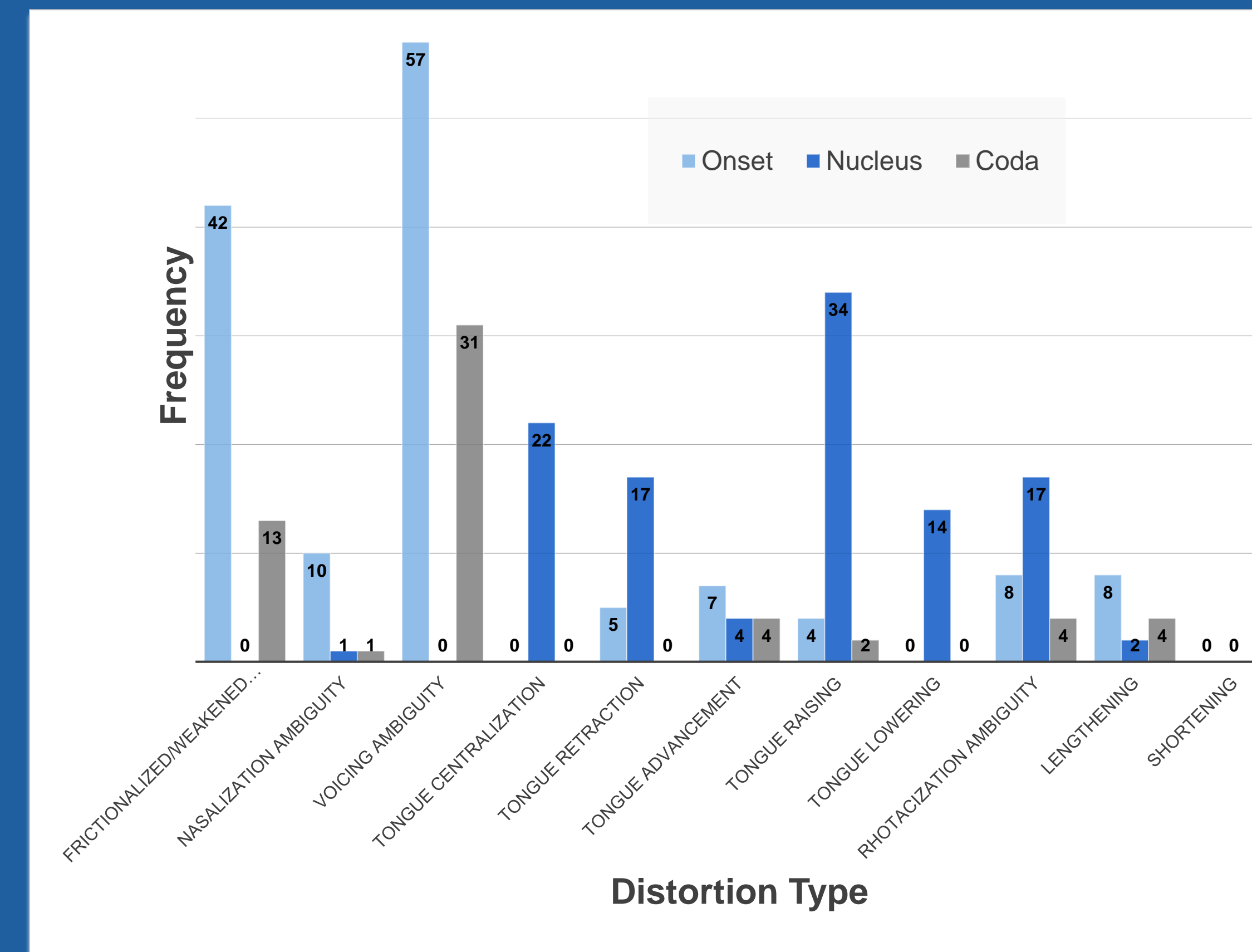
There is debate about whether consistency of error location and type should be included in the diagnostic criteria for apraxia of speech (AOS) (Bislick et al. 2017). Some studies have found that consonant and vowel imprecision are diverse and variable in AOS (Blumstein, Cooper, Zurif, & Caramazza 1977; Haley 2004) but there is evidence that errors are more consistent at syllable level than word level (Haley, Cunningham, Eaton, & Jacks 2017).

Methods

After taking an introductory clinical phonetics course, the authors were further trained in narrow phonetic transcription using Klattese, a variation of phonetic transcription that incorporates computer-readable symbols, and Praat, a software for phonetic analysis. Eleven diacritic marks were used to identify distortions. Each diacritic was introduced individually to allow time for proper ear training for each distortion.

After group training and practice examples, the authors individually transcribed 10 speakers' datasets and compared results, establishing a reliability rate of 86%. The authors then independently transcribed single word productions from 39 speakers who had sustained left hemisphere stroke. Syllables were divided into onset, nucleus, and coda. Syllable boundaries were based on the preference of English syllables to favor onsets over coda (Cutler & Carter, 1987). Distortions were coded for type and syllable location.

Distortion Frequency by Syllable Position



English	Klattese
peep	pip
sis	sIs
zoos	zuz
church	CRC
lull	l^l
roar	rCr
shush	SUS
judge	J^J
bib	bIb
nine	nYn
dad	d@d
mom	mam
gag	g@g
gingerbread	Jin.JX.brEd

English	Klattese
fife	fYf
thick	TIk
thicker	TI.kX
thickening	TI.kxn.IG
flat	fl@t
flatter	fl@.FX
flattering	fl@.FX.IG
jab	J@b
jabber	J@.bX
jabbering	J@.bX.IG
zip	zIp
zipper	zI.pX
zippering	zI.pX.IG

Results

Voicing ambiguity was the most frequently transcribed distortion (88 instances, 28.3% of total distortions.) The second-most frequently transcribed distortion was frictionalization (55, 17.7%). These results are consistent with many other studies that used narrow phonetic transcription (e.g. Haley, Shafer, Harmon, & Jacks, 2016; Hall, 2017). Of the distortions relating to tongue-position, tongue raising was the most frequently observed distortion (40, 12.9%). In deciding which syllable component has most distortions, it is most relevant to compare the onset and coda because these positions have consonantal distortions, while the nucleus of the syllable is more likely to have distortions related to tongue body position. There were 141 recorded distortions in the onset position and only 59 distortions in the coda position. There were 111 distortions in the nucleus.

Discussion

It is encouraging that the distortion frequencies followed a similar pattern to previous studies. The results suggest a higher prevalence of consonant distortions in the onset position. This finding may also be due to increased perceptual sensitivity at the beginning of words and wider tolerance of allophonic variation for word-final sounds. The possibility of perceptual differences of dialectal variation needs to be examined. Because many of the participants speak a variation of Southern American English or African American Vernacular English, dialectal differences may have appeared as distortions and been incorrectly coded as such.

References

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