



Spanish non-continuants at the prosody-phonetics interface

Karolina Broś (k.bros@uw.edu.pl), University of Warsaw

Introduction: post-vocalic voicing in Gran Canaria

Broś (2016) : recordings of several speakers from 2014/15

Oftedal (1985) : previous reports, phonetic data, systematic

Post-vocalic voicing: word level
/p/ de[b]artamento ‘apartment’
/t/ fone[d]ica ‘phonetics’
/k/ má[g]ina ‘machine’

Post-vocalic voicing: phrase level
/p/ yo [b]ienso que ‘I think that’
/t/ juntos y [d]al ‘together and so on’
/k/ de [g]olombia ‘of Colombia’

Domains of application: Voicing applies both inside words and across word boundaries, but only after a vowel: **el** [t]riple ‘three times’, **super** [k]ómodo ‘really comfortable’

Deletion as a blocker

Coda consonants are deleted both inside words and across word boundaries

After deletion the following stop becomes postvocalic, yet voicing does not apply

An otherwise extended process of voicing is blocked in the speech of the same speaker that produces voicing elsewhere in the same utterance:

la(s) caracterí(s)tica(s) ‘the features’ (*[ka.rak.te.ri.di.ga]), **por pensa(r) tontería(s)** ‘for thinking about silly things’ (*[por.pen.sa.don.te.ri.a])

But: deletion does not block other phonological processes, such as spirantisation

Assumption: post-vocalic voicing and coda elision are connected speech phenomena belonging to the phonological component

This study

1. Perception-Production study, 20 participants aged 18-32

49 target phrases presented in two conditions (voiced / voiceless)

All contexts considered: 10xp, 10xt, 10xk, 10xch, 3xpr, 3xtr, 3xkr

Total of 98 test phrases and one third fillers, all contexts included

2. Presentation of the data: phrases structured in the same way to control for pitch
Verb phrase followed by a noun phrase. Examples:

He comprado cinco panes de millo ‘I have bought 5 corn breads’

He comprado cinco tarros de garbanzos ‘I have bought 5 chickpea jars’

He comprado cinco cubos de basura ‘I have bought 5 trash bins’

He comprado cinco chocos en salsa ‘I have bought 5 cuttlefish in sauce’

3. Hypotheses:

A. The process is consistent across and within speakers

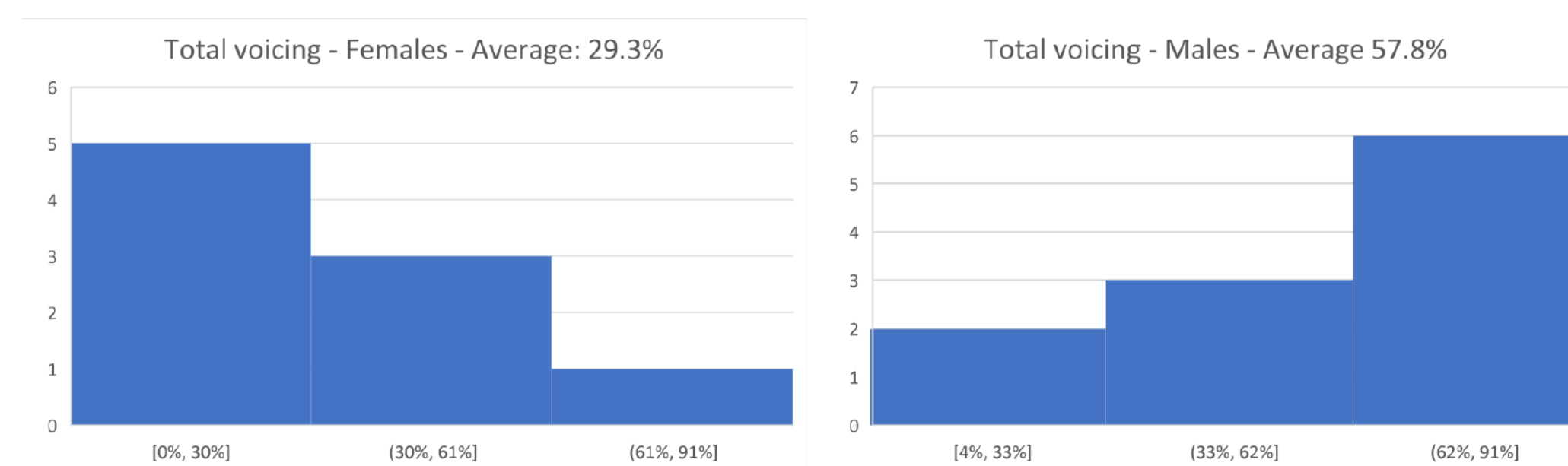
B. There are no substantial differences depending on the place of articulation

C. Voicing should occur regardless of the (lack of) voicing in the audio stimuli, but more voicing should be observed following voiced tokens

3. Results: the process is highly coarticulatory, there are inter- and intraspeaker differences, differences in the frequency of voicing depending on the context, and substantial differences between male and females speakers

Result graphics

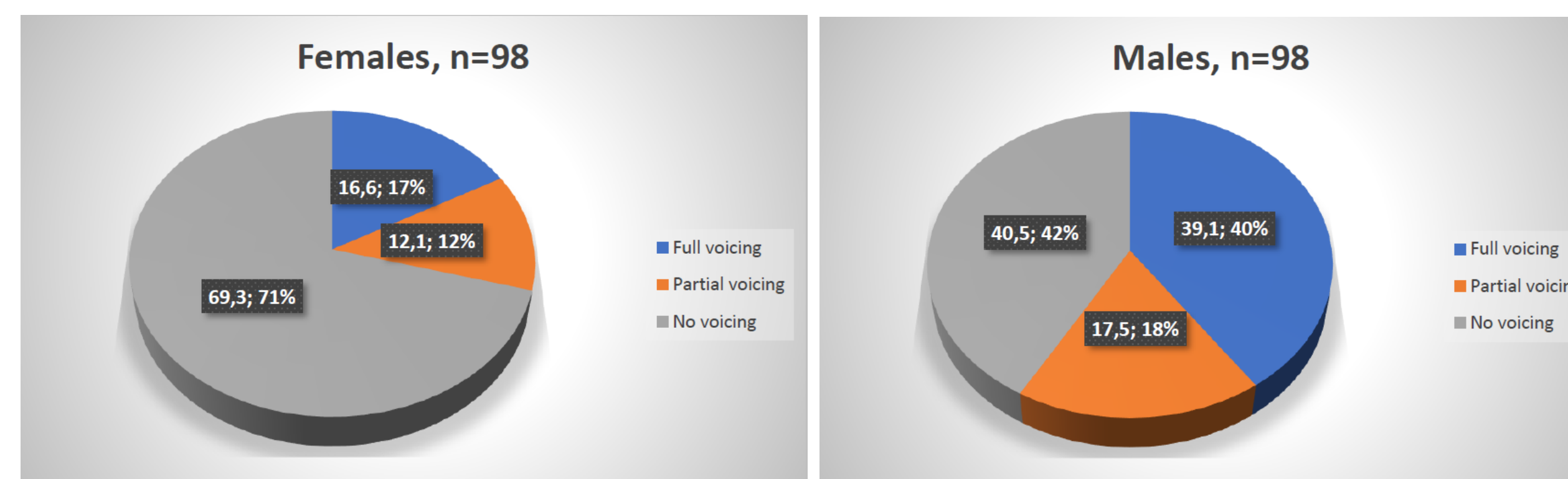
1. Different rates of voicing depending on sex



6 speakers had very rare to inexistant voicing (1=0.0, 1=0.03, 2=0.04, 2=0.1)

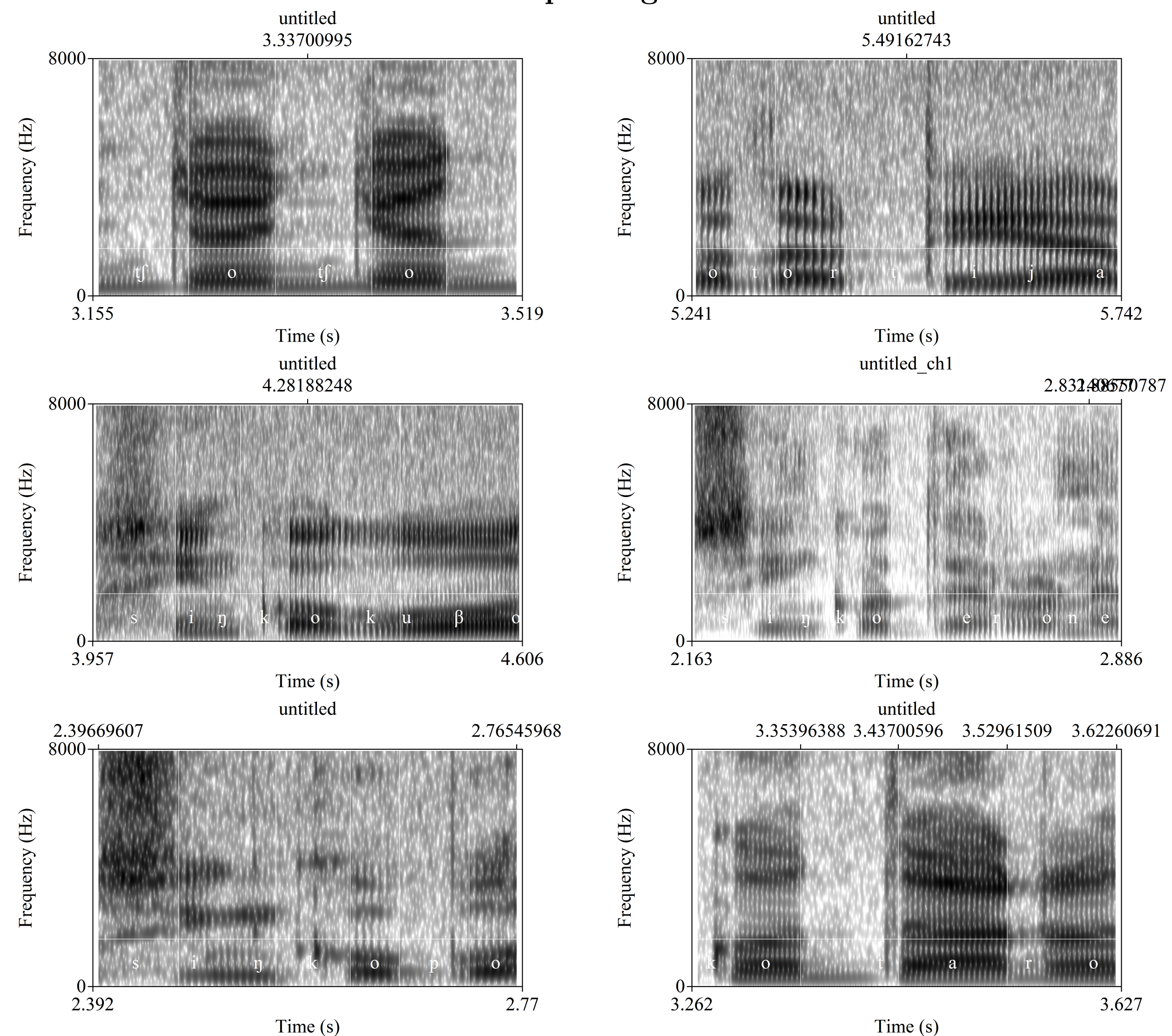
Among the females, only 1 had a substantial voicing rate (0.9), followed by 2 medium frequency users (0.5, 0.45). 9/11 males had voicing rates of 0.5 or more

2. Voicing is gradient

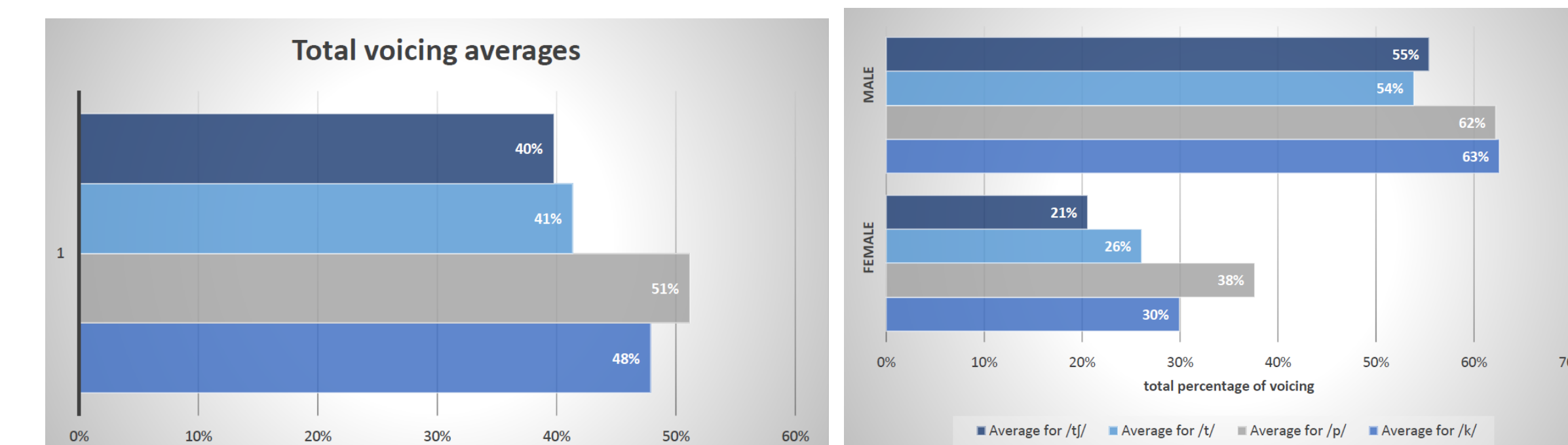


Many cases of small voicing tails of the preceding vowel and pulses during the initial part of the closure which were not counted as voicing
Partial voicing was annotated if > 50% of the duration of the stop had voicing
Full voicing was annotated when 100% of the duration of the stop was voiced
Voicing was measured by the presence of the voicing bar, pulses and voice report

3. Spectrograms



Voicing distribution by sound



/t/ is definitely the least voiced option

/p/ is voiced the most often by both females and males

/k/ is the most likely to be voiced fully, with no plosion and formants

/k/ is the most likely to be voiced in subjects who almost do not voice

The affricate is voiced by almost all males, but typically no females (1 female: 91% rate, skewed the average)

Differences between pre-vowel and pre-sonorant contexts even out in averages

Other issues:

Small/no voicing regardless of physical pauses (few if any) and speech rate (fast speech is not a good predictor)

Many times, no voicing in target area but voicing elsewhere, especially non-coronals, inside words

Possible Explanations

1. Non-melodic phonological remnants / structural elements visible in the phonetics component, influence on voice spilling across sonorants (e.g. Goldrick 1998)
2. Fine-grained phonetic modulation of speech production at prosodic junctures and phonetic strengthening at domain boundaries (Keating 2006; Cho 2016; Fougeron and Keating 1997)
3. Possible effect of differences in NP phrasing (parsing of constituents with/as separate from the numeral)
4. Possible effect of word retrieval from memory (perception test) and hesitation
5. Possible effect of prosody (especially pitch accent and rhythm), requires further study (cf. Quilis 1993)
6. Gestural masking: cross-tier gestural overlap may lead to apparent deletion in perceptual terms (Browman & Goldstein 1990)

General conclusion: The phonetics component has access to deep structure (blocking takes place in phonetic opacity)

Special thanks to speakers: Jesael, Jesús, Cristobal, Abián, Zoraida, Aitor, Eli, Carmen, Gladys, Arminda, Brenda, Aurora, Carolina, Edgar, José, Ariel, Álvaro, Eliezer and Adexe!