

Contact effects on voice-onset time (VOT) in Patagonian Welsh

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Background

- Welsh
 - Brythonic Celtic
 - Wales & Argentina
- Patagonian Welsh
 - Since 1865
 - Long-term Spanish contact
- Jones' 1984 study on Welsh in Gaiman, Patagonia [7]
 - Young speakers: 'Spanish unaspirated' /p t k/
 - Older speakers: 'Welsh aspirated' /p t k/
 - Middle-aged speakers: split
 - No specific VOT values
- VOT (voice-onset timing)
 - Negative (voicing lead) or positive (lag) [8]
 - Languages differ in how they contrast voiced and voiceless stops: [voiced], [voiceless unaspirated], [aspirated] [5]

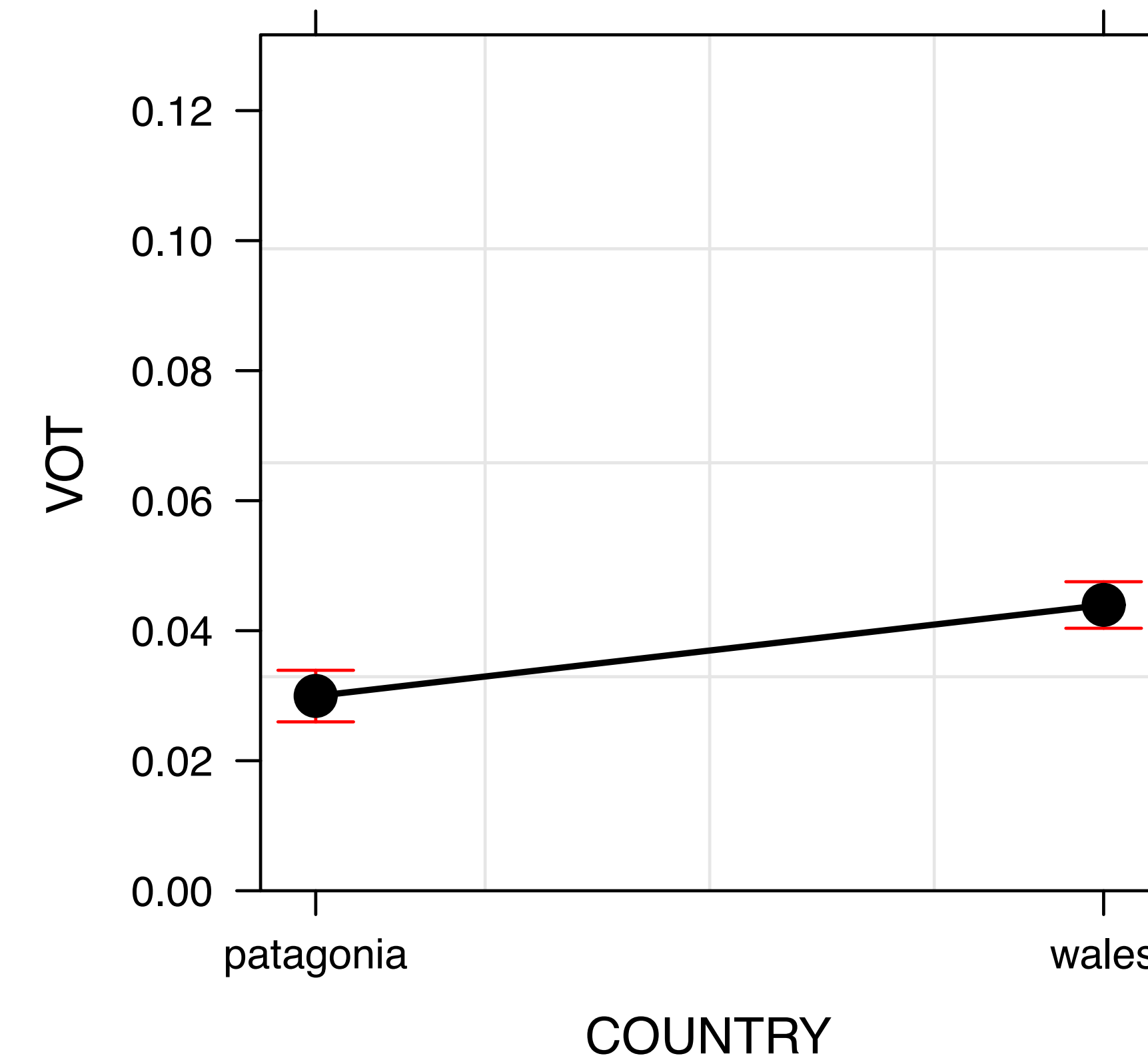


Results

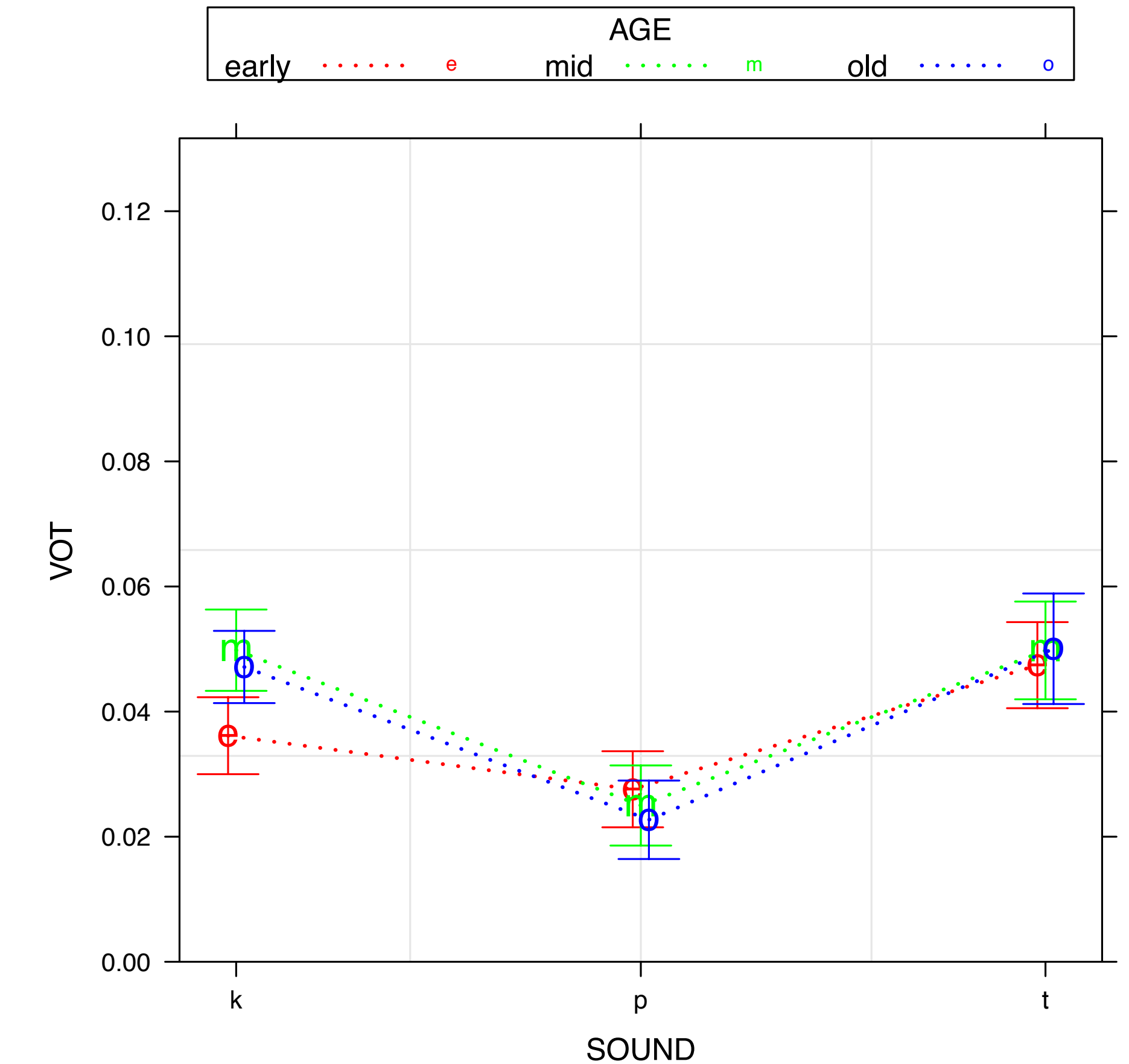
- Final model ($R^2m=0.36$; $R^2c=0.43$)
 - Highest level predictors of VOT:
 - Country** ($p=3.44e-06$)
 - Sound*Age** ($p=0.015$)
 - Random effects: Speaker kept, Word discarded
 - Fixed effects:

	Coefficient estimate	Standard error	DF	t-value	Pr(> t)
(Intercept)	0.031	0.002	36.64	15.36	< 2e-16 ***
Country:Wales	0.014	0.003	30.63	5.16	1.4E-05 ***
Sound:k_vs_p.t	0.007	0.002	264.51	3.56	0.0004 ***
Sound:p_vs_t	-0.024	0.003	264.22	-9.08	< 2e-16 ***
Age:Early_vs_Middle.Old	-0.004	0.003	29.07	-1.28	0.209
Age:Middle_vs_Old	0.001	0.003	35.87	0.46	0.651
Sound:k_vs_p.t x Age:Early_vs_Middle.Old	-0.013	0.004	263.8	-3.07	0.002 **
Sound:p_vs_t x Age:Early_vs_Middle.Old	0.006	0.005	264.01	1.18	0.239
Sound:k_vs_p.t x Age:Middle_vs_Old	0.002	0.005	276.68	0.33	0.743
Sound:p_vs_t x Age:Middle_vs_Old	0.002	0.007	267.87	0.37	0.708

COUNTRY effect plot



SOUND*AGE effect plot



Discussion

- Patagonian speakers produce /p t k/ with significantly shorter VOT than Welsh speakers**
 - VOT continuum points to phonetic influence from contact:

	/p/	/t/	/k/
Spanish (Argentina) [4]	10	15	25
Welsh (Patagonia)	17	40	36
Welsh (Wales)	31	55	49
English [8]	58	70	80

- No age-graded difference**
 - No interaction between Age & Country; applies to all Patagonian speakers
 - Differs from Jones, where younger speakers had 'Spanish' (less aspirated) /p t k/ and older speakers had 'Welsh' (more aspirated) /p t k/
 - Less-aspirated /p t k/ reported in Jones' younger and middle-aged speakers start of diachronic shift, rather than synchronically age-graded pattern

- Shorter VOT could point to possible shift in voicing contrast**
 - Standard Welsh contrasts /p t k/ and /b d g/ on aspiration, rather than voicing [1]
 - If Patagonian /b d g/ shift towards or into negative values, this contrast could change:

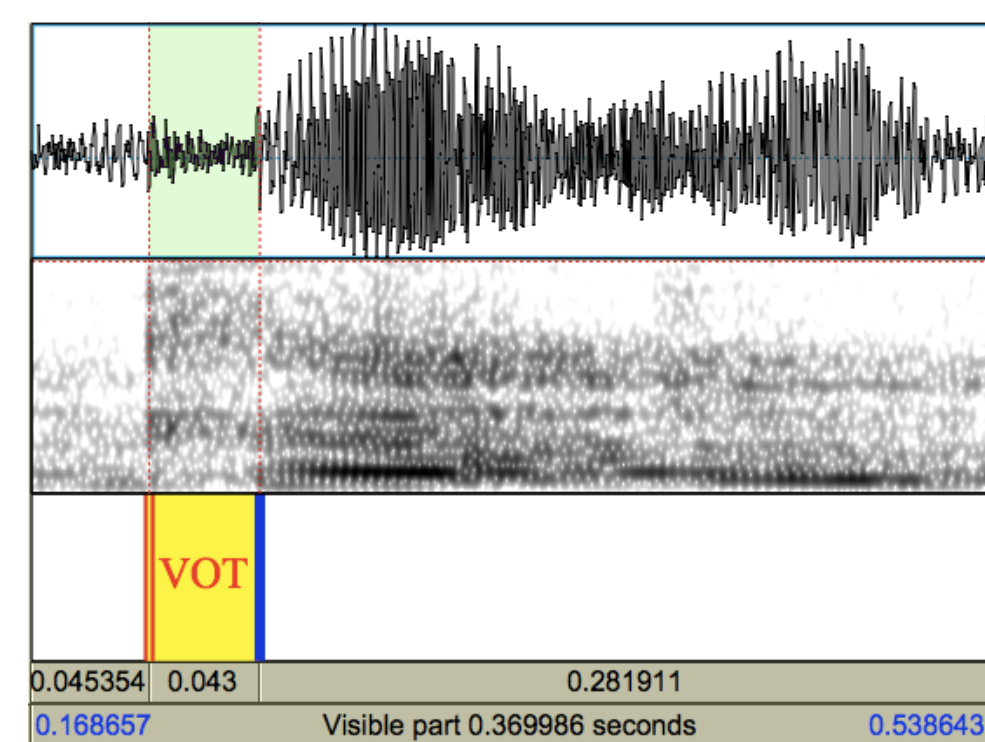
	Welsh (Wales)		Patagonian Welsh
/p t k/	voiceless aspirated	shorter VOT values for /p t k/	voiceless unaspirated
/b d g/	voiceless unaspirated	→	voiced?

- Older speakers in Patagonia & Wales produce /k/ with longer VOT than younger speakers**
 - Pattern of contrasting /p/ vs. /t k/ acquired later in language development?

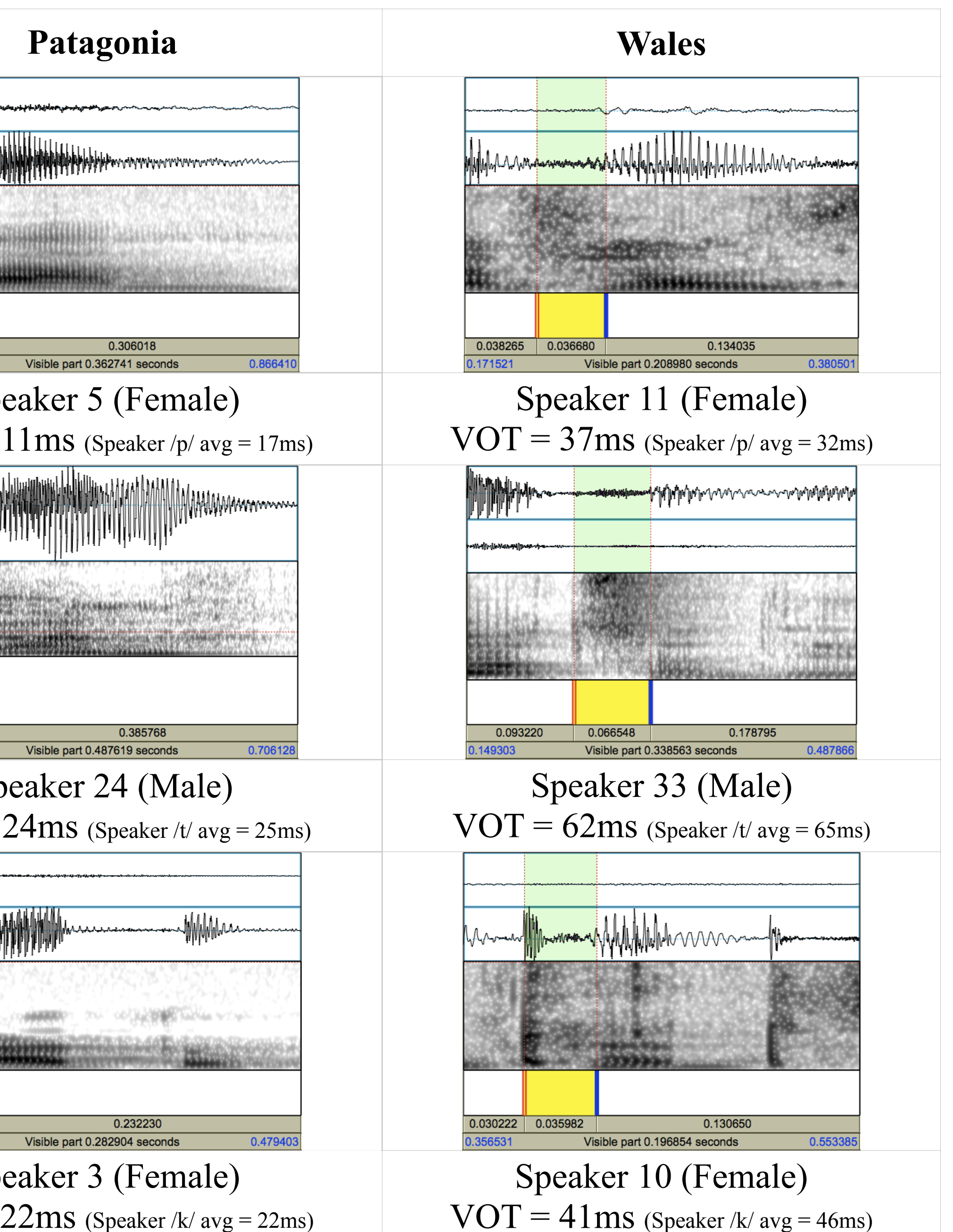
Data/Methods

- Conversational corpus data: Bangor Siarad/Patagonia [6]
- 36 speakers (18 from Wales, 18 from Patagonia)
 - 9 male and 9 female speakers from each
 - 3 each of Early (0-29), Middle (30-59), Older (60+)
- Tokens with word-initial /p t k/
 - Followed by /a/
 - Non-prominent, phrase-medial, initial-stress

/p/:	'/pam/' '/pabel/'	'why/' 'tent'
/t/:	'/tan/' '/tatus/'	'until/' 'potatoes'
/k/:	'/kani/' '/kaste/'	'to sing/' 'castle'



- 291 tokens total
- Statistical methods: linear mixed-effects model [2]
 - Dependent variable: VOT
 - Fixed effects: Country, Sound (/p t k/), Age, Sex
 - Random effects: Speaker, Word



Conclusions

- Patagonian Welsh speakers produce voiceless stops /p t k/ with significantly shorter VOT than Welsh speakers**
 - Confirms & quantifies Jones' [7] observations: less aspirated stops **due to contact with Spanish**
 - Applies to all age-groups**; lower VOT values now a **unique phonetic feature** of Patagonian Welsh
- Future research: /b d g/; changing sociolinguistic situation and increased contact from Wales

References

- [1] Ball, Martin J. 1984. Phonetics for Phonology. In Martin J. Ball & Glyn E. Jones (eds.), *Welsh Phonology: Selected Readings*. Cardiff: University of Wales Press. 5-39.
- [2] Bates, D., M. Maechler, B.M. Bolker & S. Walker. 2014. lme4: Linear mixed-effects model using eigen and s4. *Journal of Statistical Software*. URL: <http://arxiv.org/abs/1406.5823> [3] Boersma, Paul & David Weenink. 2015. Praat: doing phonetics by computer. Computer Program. Version 5.4.17, retrieved 25 August 2015 from <http://www.praat.org/> [4] Benozet de Mairieux, Ana Maria. 1980. *Manuel de fonética acústica*. Buenos Aires: Librería Hachette. [5] Cho, Tachong & Peter Ladefoged. 1999. Variation and universals in VOT: evidence from 18 languages. *Journal of Phonetics*, 27, 207-229. [6] Deuchar, Margaret, P. Peredur Davies, Jon Russell Herring, M. Carmen Parafita Couto & D. Carter. 2014. Building bilingual corpora. In Enlli Môn Thomas & Ineke Mennen (eds.), *Advances in the Study of Bilingualism*. Bristol: Multilingual Matters. [7] Jones, Robert O. 1984. Change and Variation in the Welsh of Gaiman, Chubut. In Martin J. Ball and Glyn E. Jones (eds.), *Welsh Phonology*. Cardiff: University of Wales Press. 237-261. [8] Lisker, Leigh & Arthur S. Abramson. 1964. Cross-language study of voicing in initial stops: acoustical measurements. *Word*, 20, 384-422. [9] R Core Team. 2015. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing. Vienna, Austria. [10] Zuur, A., E.N. Ieno, N. Walker, A.A. Saveliev, & G.M. Smith. 2009. *Mixed effects models and extensions in ecology with R*. New York: Springer Science & Business Media. [Image: Wikipedia]