

THE PRODUCTION OF OBSTRUENTS BY CHILDREN ACQUIRING NORTH AUSTRALIAN KRIOL

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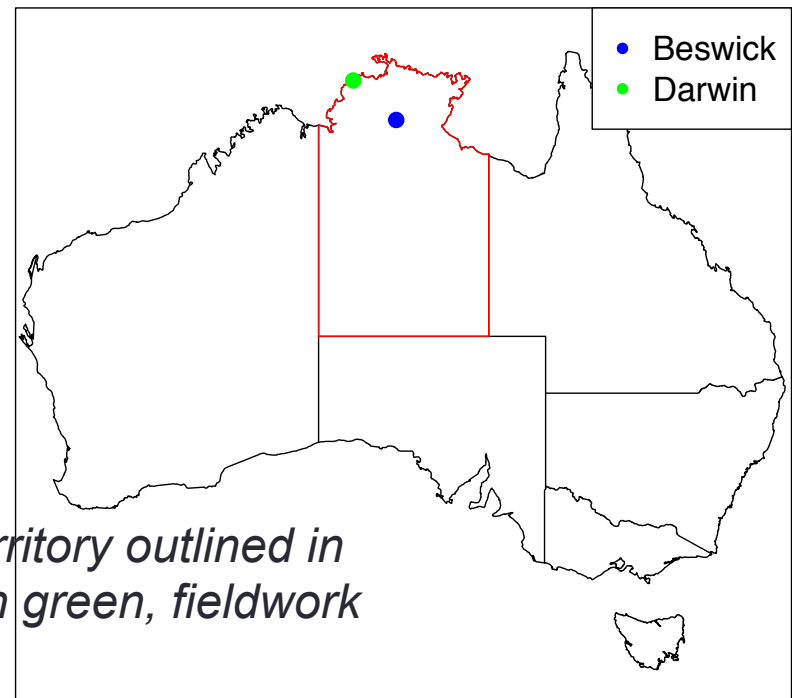
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Kriol

- North Australian Kriol is an English-lexified creole
- Spoken by ~20,000 people, predominantly in Northern Australia (AIATSIS, 2005).
- Developed during the last 100 years, from New South Wales pidgin, spread with the pastoral industry.
- Often characterized as having extreme levels of variation in phonemic inventories and the pronunciation of lexical items.



Map of Australia, Northern Territory outlined in red, NT capital city (Darwin) in green, fieldwork location (Beswick) in blue

Variability in Kriol

This high degree of variation is reported in **early** work on Kriol (Sandefur, 1986):

- *buludang*, *bludang*, *blutang* for ‘blue-tongue lizard’
- *Jinek*, *jineik*, *sineik*, *sneik* for ‘snake’

But also in **recent** work both **within** and **between** speakers:

- /ɟabic/ ~ /ɟebic/ ~ /sevis/ produced by early Gen1/L2 speaker (Bundgaard-Nielsen & Baker, in press)
- Variation between ‘*det*’ and ‘*thet*’ realisations of the article in Barunga (Jones & Demuth, 2015)

Previous work on Kriol

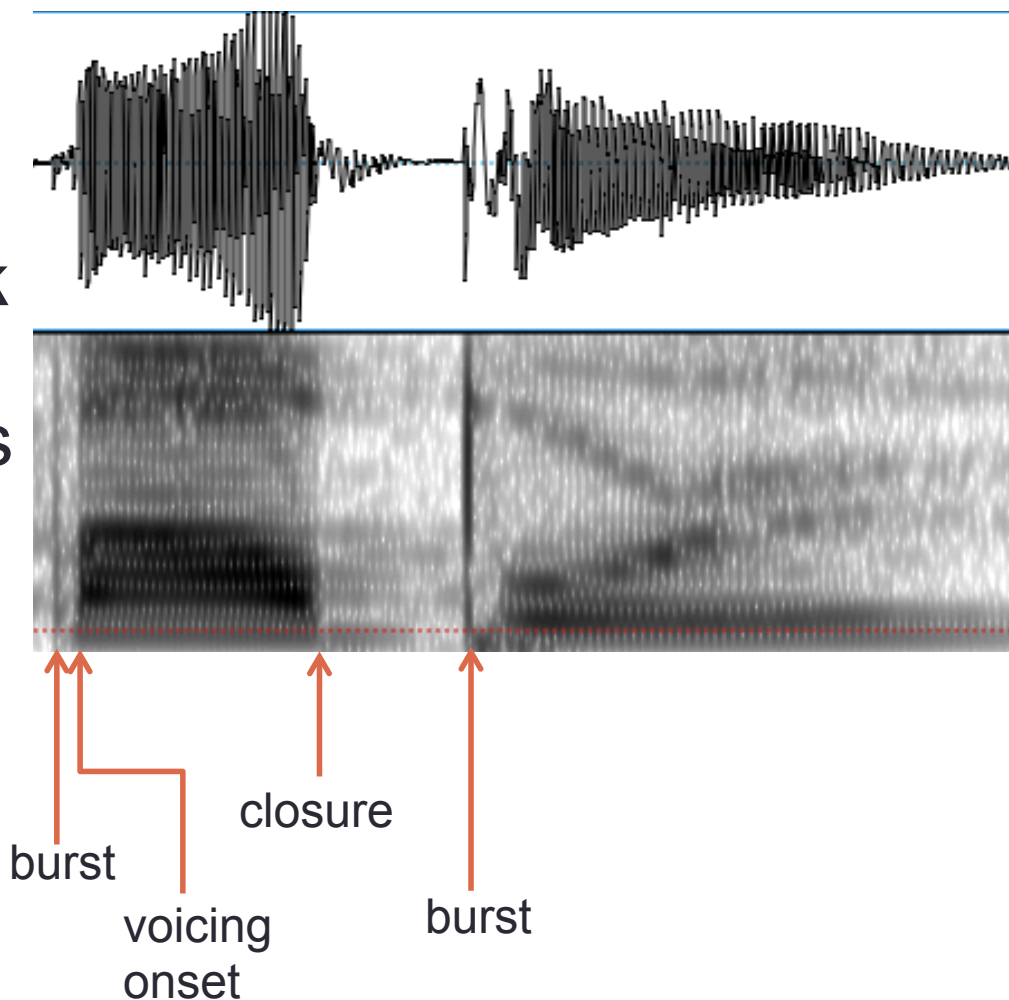
- Recent experimental investigation of Kriol compared different generations of Kriol speakers (Baker et al. 2014)
- Results indicated stable lexicon and phonemic inventory – productions were consistent within and between 2nd and 3rd generation Kriol speakers.
 - Initial stop voicing distinguished by **VOT**
 - Medial stop voicing distinguished by **VOT** and **constriction duration**
- Participants were literate adult speakers who had long-term experience with English

Predictions

- Do L1 **Kriol speaking children** (with very little experience with English) exhibit the same consistency in obstruent productions that adult speakers do?
- Predictions: If experience with English affects the realization of obstruent voicing contrasts in Kriol...
 - Obstruent productions by L1 Kriol children **will not** pattern with productions by adult speakers
- If experience with English does not affect the realization of obstruent voicing contrasts in Kriol...
 - Obstruent productions by L1 Kriol children **will** pattern with productions by adult speakers

Current Work

- We conducted a **lexical elicitation task** to obtain productions of voiced and voiceless obstruent segments
 - Voice onset time (VOT): time between stop release/burst and onset of voicing
 - Constriction duration (CD): time between stop closure and stop release



Item 'bubble': initial VOT and medial CD measurement points indicated by arrows

Participants

- We recruited 13 Kriol-speaking children in Beswick, NT:
 - 7 female; 6 male
 - Age ranging from 4;8-7;0 years; *M* age = 6;2
 - Written parental/caregiver consent was obtained for all children
 - Each child got to choose a small toy (book, car, doll, or markers) as a thank you

Methods



- Recorded with a (DPA d:fine) headset microphone and (PMD660 Marantz flash-RAM) digital recorder in a quiet room
- 16-bit sampling depth with a sampling rate of 44.1 kHz

(This is Merelda, who is not part of the present study, but who is happy to model the setup).

Methods

- Photographs of easily depictable nouns (tiger, bucket, spider) shown to children one at a time (24 total)
- Kriol language prompt *Wanem dijan?* (What is it?) played to ask children to name the picture (in Kriol)
- Items were chosen because they featured initial and medial /p t k b d g/



Methods

- Target consonants were segmented in Praat (Boersma & Weenink 2014)
- **Voice onset time (VOT)** and **constriction duration (CD)** measurements extracted

	initial tokens	medial tokens
/p/	100	54
/b/	213	115
/t/	237	50
/d/	46	5
/k/	126	87
/g/	46	68

- Non-target tokens with target segment and related meaning included ('cup' for 'coffee')
- Exclusion criteria: background noise, laughter, microphone contact, disfluency

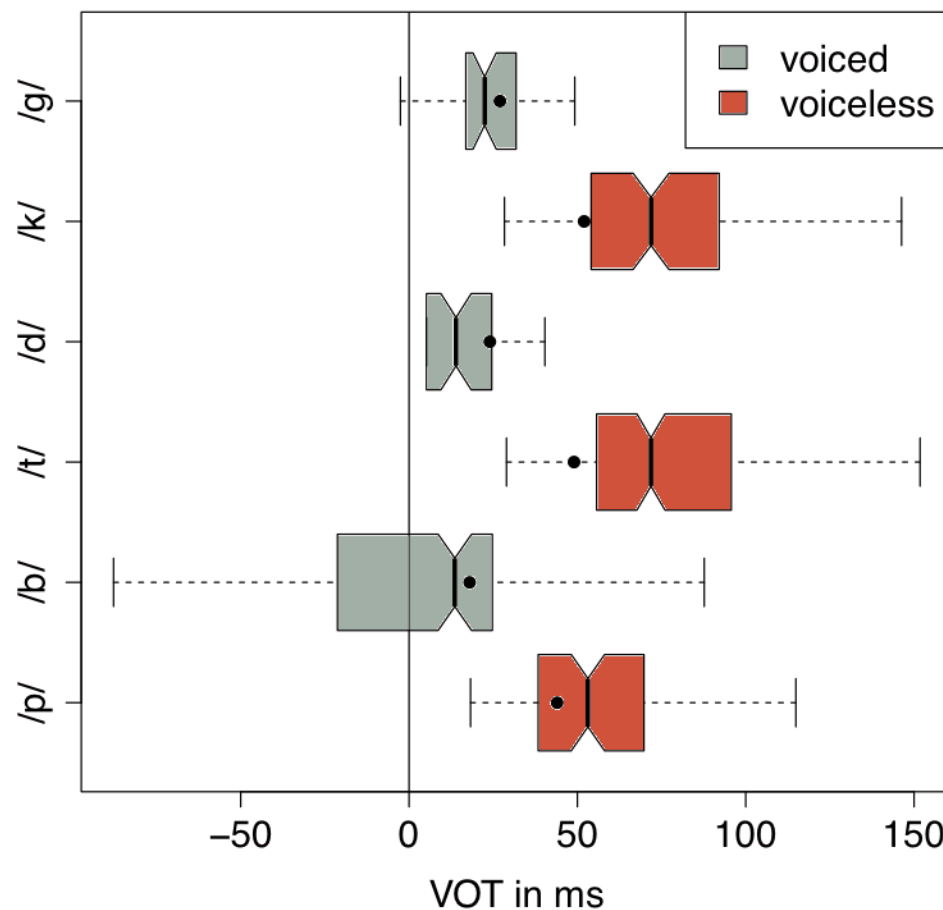
Combined consonant productions from lexical elicitation task and mispronunciation detection task

Analysis

- 3 linear mixed effects (LME) models created using R and *lme4*
- VOT of stops in initial position
- VOT of stops in medial position
 - coronal place of articulation excluded
- CD of stops in medial position
 - coronal place of articulation excluded

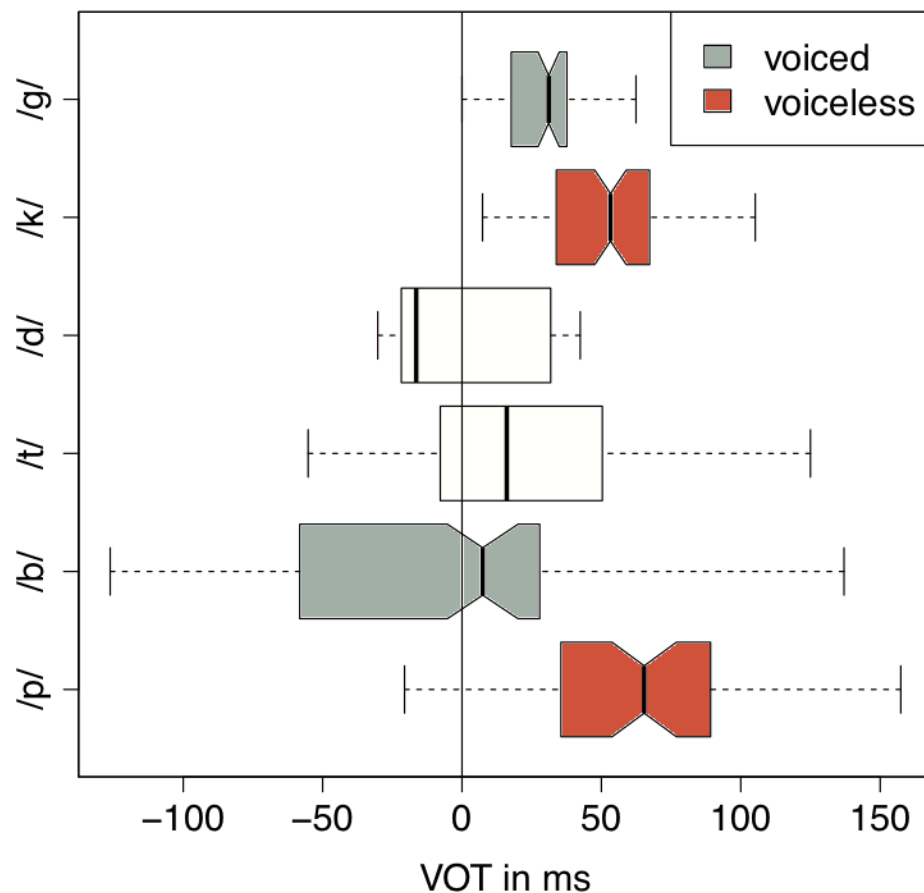
Results: Initial VOT

- Significant interaction of place of articulation and voicing
- Follow-up tests showed significant effects of voicing on VOT at each place of articulation



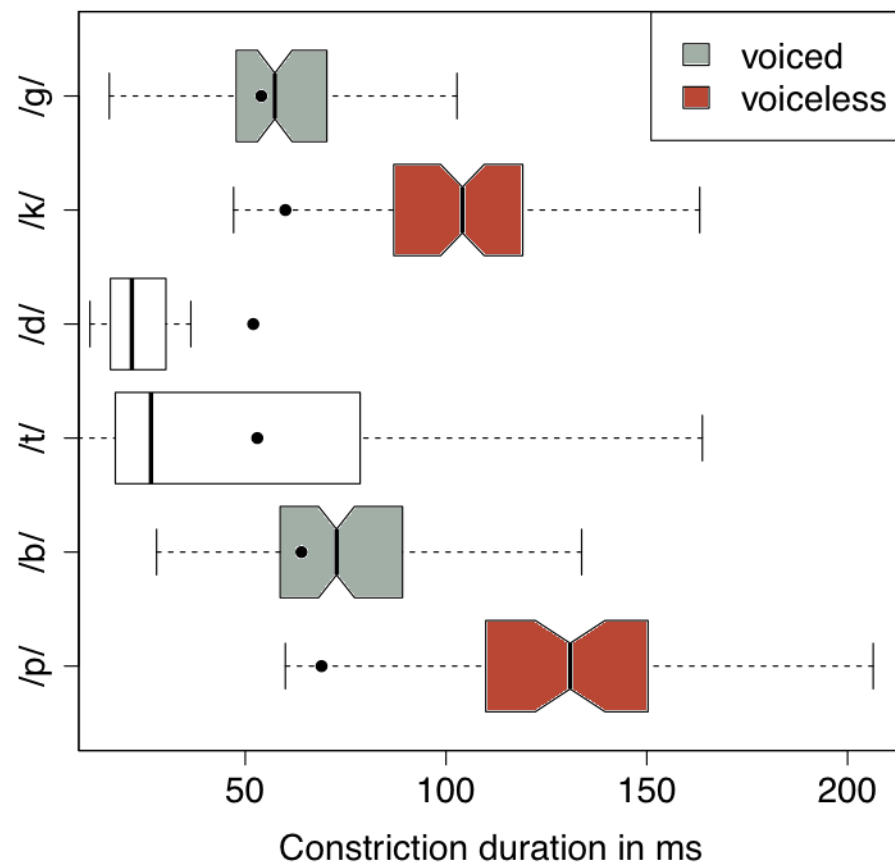
Results: Medial VOT

- No significant interaction of place of articulation and voicing
- Significant effect of place of articulation on VOT of voiced and voiceless stops
- No significant effect of voicing on VOT at any place of articulation
- Contrary to results of Baker et al. (2014)



Results: Medial CD

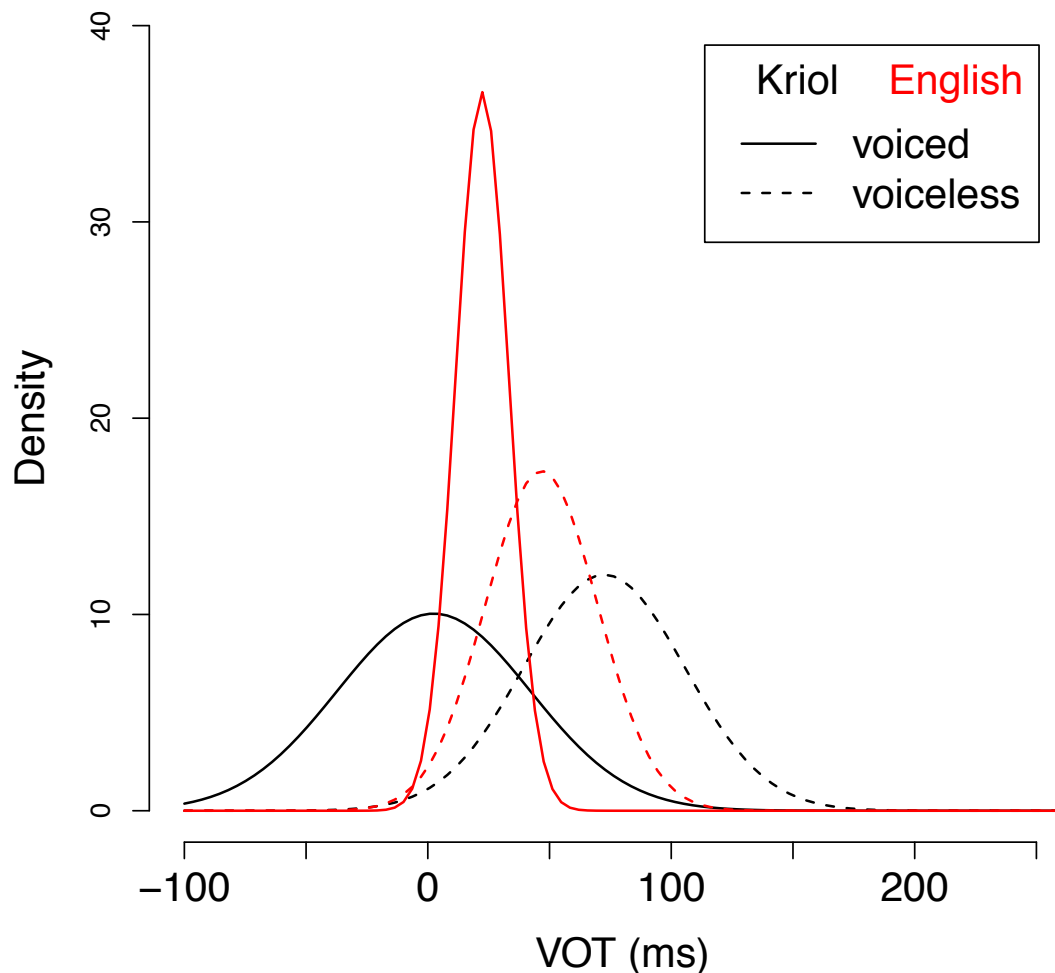
- No significant interaction of place of articulation and voicing
- No significant effect of place of articulation on CD of either voiced or voiceless stops
- Significant effect of voicing on CD of bilabial and velar stops



Discussion

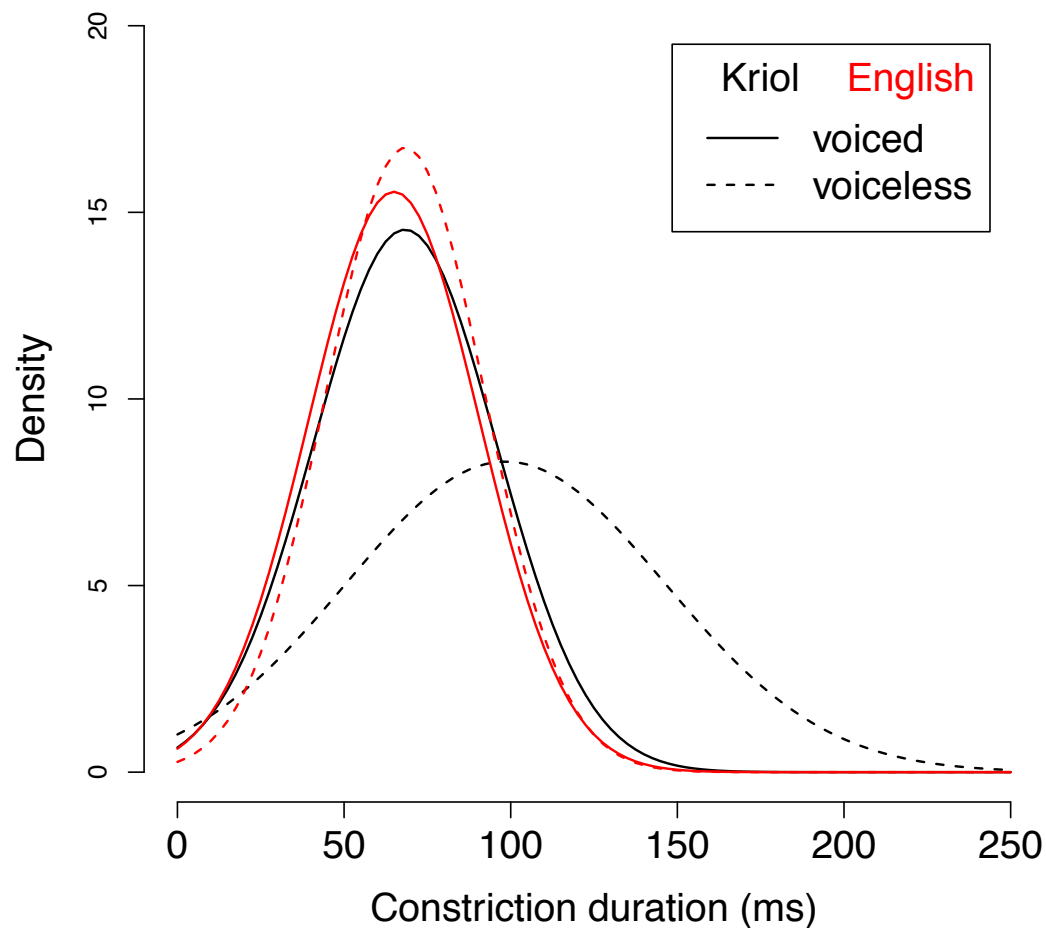
- Two acoustic dimensions distinguish voiced and voiceless stops in Kriol: VOT and CD
- **Word initial stops** are distinguished by **VOT**
- **Word medial stops** are distinguished by **CD**
- VOT and CD are longer for voiceless stops than for voiced stops
- **Bimodal distributions** for VOT and CD based on phonemic voicing category membership.

Kriol and English (VOT)



- Kriol is English-*like*, but *not* English
- VOT distinctions follow the same pattern, but differences are greater

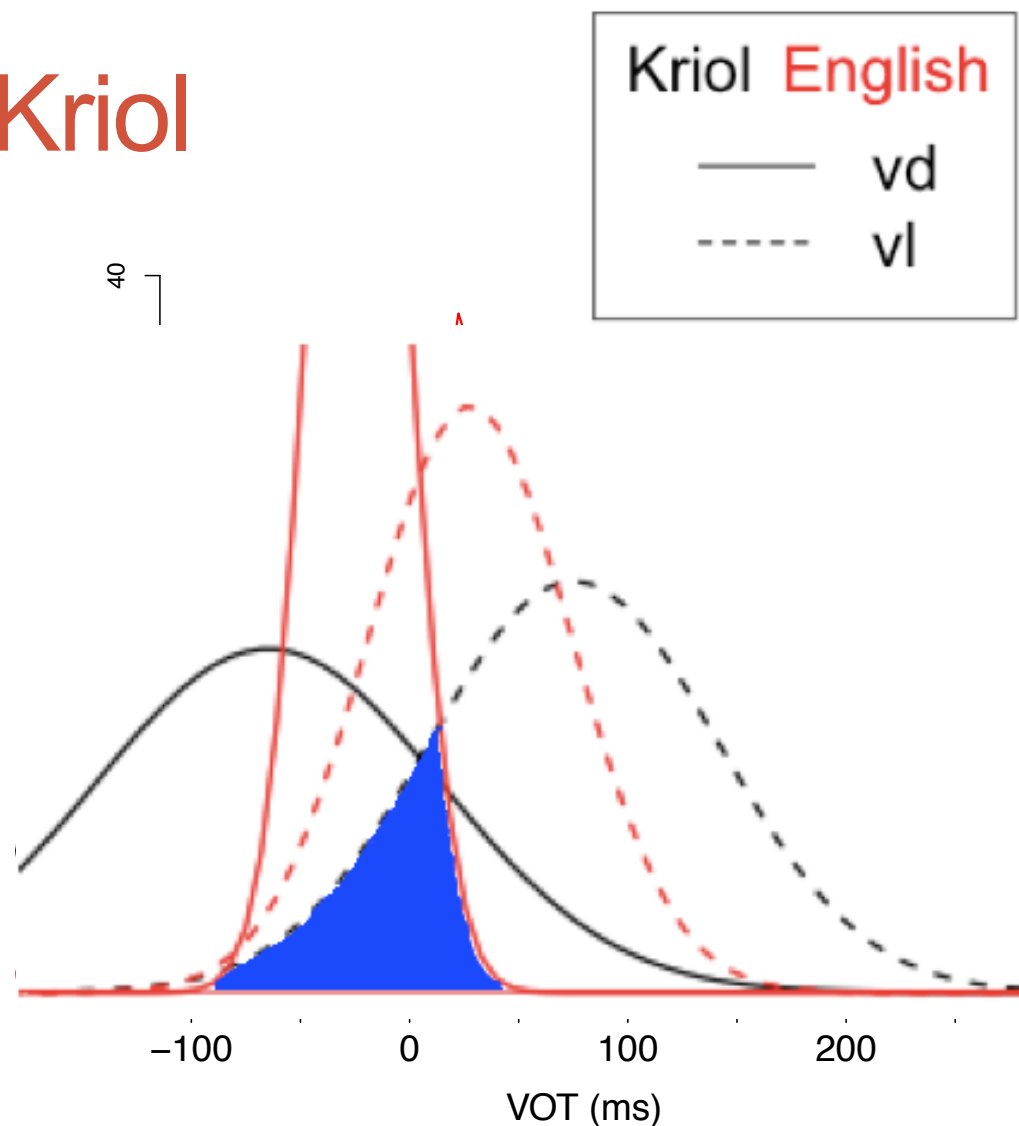
Kriol and English (CD)



- Medial CD in Kriol is unlike that of English
- More similar to CD ratio for medial stops in languages like Ngalakgan (one of Kriol's contributing substrate languages)
 - Lenis:fortis ratio = 1:3, 1:4 (Baker 2008)

Misperception of Kriol

- Perceptual Assimilation Model (Best 1995)
 - Perception of non-native contrasts is inhibited by perceptual assimilation of non-native phonemes into native categories.
 - This leads to... English speakers' cross-category (mis-)perception of Kriol obstruent voicing (*jineg* vs. *sinek* for 'snake') as highly variable
 - ...and to the challenges L1 Kriol speaking children face in English medium education



Conclusion

- Kriol speaking children generally follow the patterns of Kriol speaking adults reported in Baker et al. (2014)
- Child speech (specifically VOT) has been reported to be more variable than adult speech (Eguchi & Hirsh, 1969; Tingley & Allen, 1975; Whiteside et al., 2003; Yu et al., 2015)
- Contrary to those predictions, these results show similar variability in VOT for child and adult speech (similar results: Ohde, 1985; Stathopoulos, 1995).
- Contrary to Baker et al. (2014), we found that word medial voicing contrasts were consistently realized using CD.

Thank you!

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