



The social life of phonetics and phonology

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0. Aims of the presentation

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1. a critical assessment of sociophonetics

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 - a brief history of sociophonetics
 - definitions & delimitations

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1. a critical assessment of **sociophonetics**
 - a brief history of sociophonetics
 - definitions & delimitations
- why?
 - sociophonetics is a rather vague label
 - and this is probably not such a good thing
 - more later...

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2. outline a number of areas for development

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- speech production
- speech perception
- linguistic theory
- applied areas

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- speech production
 - speech perception
 - linguistic theory
 - applied areas
-
- to illustrate the range of sociophonetic research
 - to highlight work beyond LVC

1. Sociophonetics - a brief history

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- first usage: Deshaies-Lafontaine (1974)

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 - UCL PhD on Canadian French
 - consciously coined to parallel **sociolinguistic** (p.c.)
 - Labovian variationist study

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Santerre: spread of apical [r] in Montréal

Elbaz: gender differences in Moroccan Arabic

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Elbaz: gender differences in Moroccan Arabic

Léon: charm in Brigitte Bardot's voice



1. Sociophonetics

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- considerable increase in currency from c. 1995
- largely same remit within **sociolinguistics**:
 - variationist work on phonetic (+ phonological) issues
 - mostly acoustic or auditory analysis
 - mostly vowels
 - search for socially-correlated patterns
 - theory: origin & transmission of change

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[-t,-d] deletion

gendered [s] in Glaswegian

gendered differences in Russian

phonetic differences between gay and straight men

phonology

suprasegmentals

conversation

paralinguistic

L2/lexis

descriptive

methods

perception

relationship between /l/ and /r/ in English

Orkney/Shetland intonation

cross-linguistic analysis of voice quality

other-initiated repair

turn-holding mechanisms

cross-linguistic analysis of radio & tv talk

semantics of back channels in Japanese

loanword pronunciation in German

accounts of Cocos Malay, Albanian

EPG analysis of [t, d] in Swedish

corpus methodologies

modelling perception of vowel height

effects of variation on information processing

1. Sociophonetics

- a further 60 papers in ICPHS 2003 sessions:

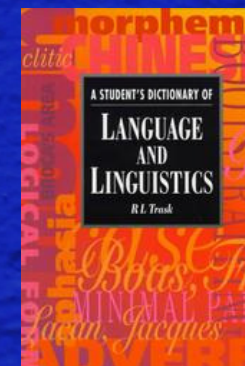
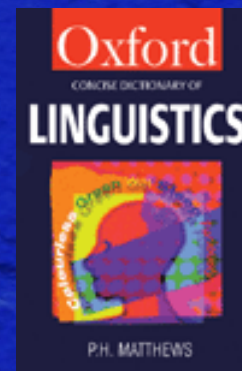
vowel variation	10 papers, inc. Khattab, Scobbie
sound change	5, Huckvale, Helgason
sound change in Romance	6, Hajek
sound change & variation	4, Lavoie, Watson
phonetics of speech styles	25, Cowie, Douglas-Cowie
variation in prosody	6, Grabe
var'n & speech technology	3, Kohler, Greenberg
fieldwork methods	1, Foulkes

1. Sociophonetics

- in spite of increased currency there has been no adequate definition of terms

1. Sociophonetics

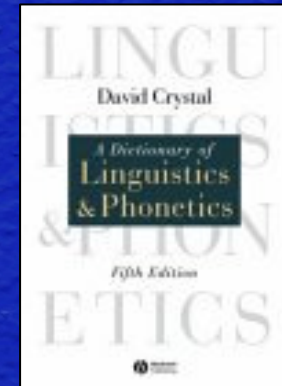
- in spite of increased currency there has been no adequate definition of terms
- no reference to sociophonetics in
 - Matthews (1997)
 - Trask (1997)
 - OED (2nd ed. 1989)



1. Sociophonetics

Crystal, *Dictionary of Linguistics & Phonetics*

– first inclusion in **5th edition**, 2003

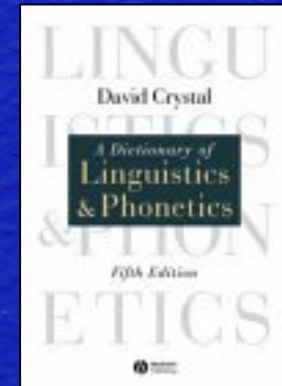


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sociolinguistics. A branch of linguistics which studies all aspects of the relationship between language and society... Any of the branches of linguistics could, in principle, be separately studied within an explicitly social perspective, and some use is accordingly made of such terms as sociophonetics and sociophonology, when this emphasis is present, as in the study of the properties of accents.

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1. Sociophonetics

Trudgill, *Glossary of Sociolinguistics* (2003)

sociophonetics. The sociolinguistic study of phonetic features and/or the use of phonetic techniques and expertise for carrying out sociolinguistic work.

Swann et al, *Dictionary of Sociolinguistics* (2004)

sociophonetics. Involves the application of phonetics to sociolinguistic study. For instance, research may draw on the acoustic measurement of speech sounds to investigate aspects of regional variation, social variation, stylistic variation, or language change.

1. Sociophonetics

- recent definitions are getting there, but perhaps have offer too narrow a view

1. Sociophonetics

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 - lack of focus for research, jobs, courses
 - leaves research in sociophonetics as minority interest on peripheries of established disciplines
 - impedes cross-fertilisation of ideas between phon and socio elements
 - renders voices unheard outside socio and phonetics (e.g. in linguistic theory, including phonology)

1. Sociophonetics

- so... here's my view of what sociophonetics is:

The sociolinguistic study of phonetic and phonological features,
and the use of phonetic and phonological techniques and
expertise

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- develop **theoretical models** (in sociolinguistics, speech production & perception, linguistics, phonology, language change, first & second language acquisition, conversational interaction, etc)
- inform and develop a range of **applied disciplines** (including speech therapy, education, speech technology, commerce, forensic speech science)

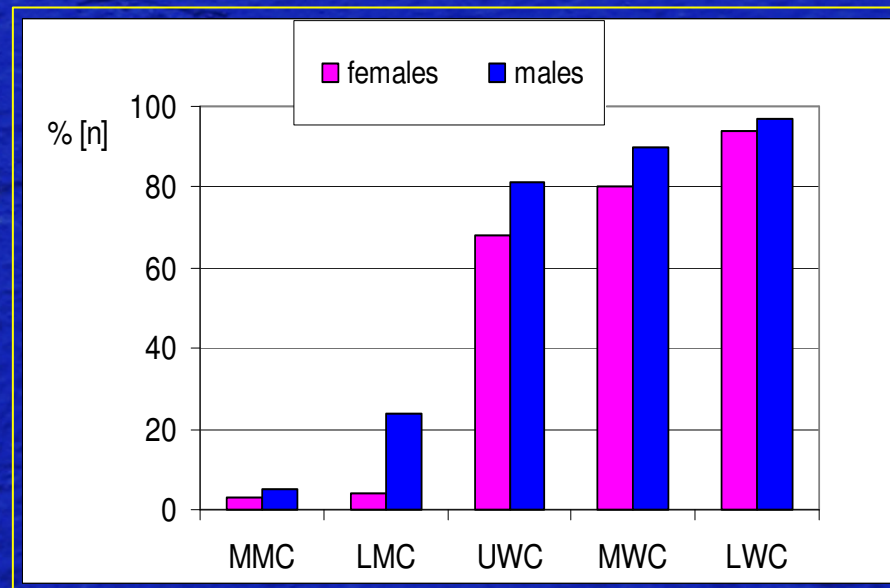
1. Sociophonetics

- to illustrate some focus areas:
 - speech production
 - speech perception
 - linguistic theory
 - applied areas
- highlight issues which are under-represented at socio end of spectrum

2. Speech production

2.1 loci of variation: segments

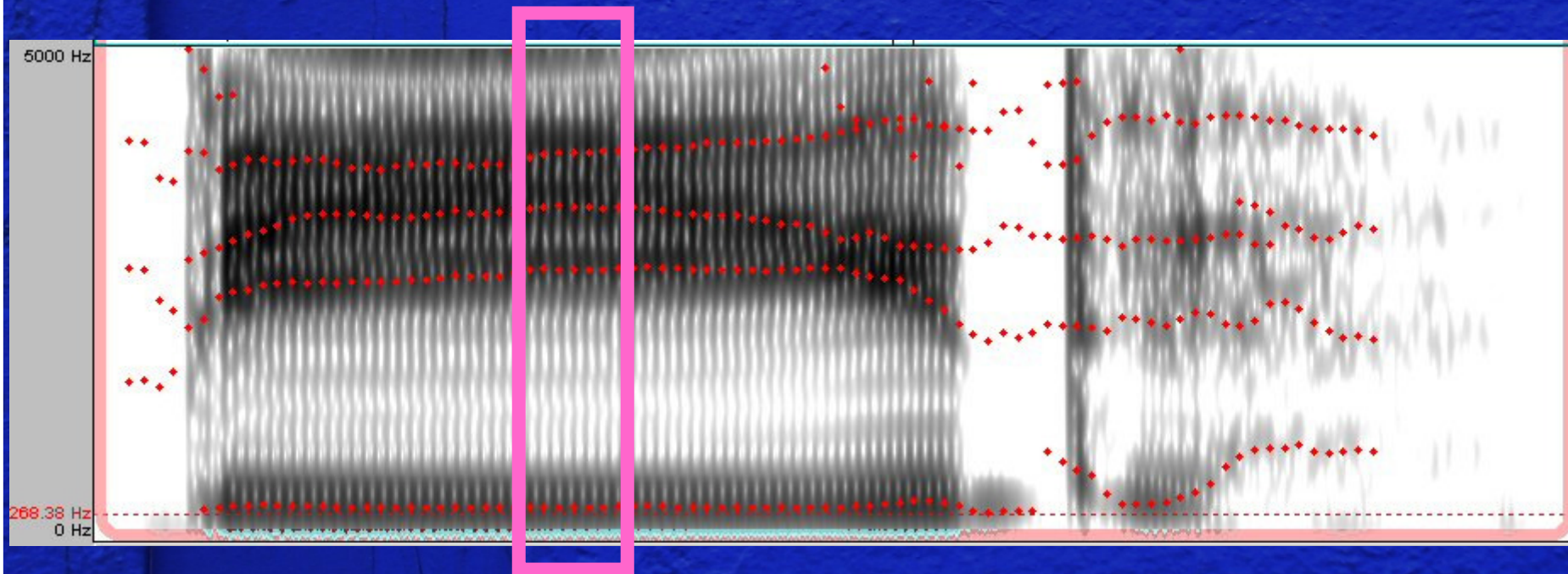
- extensively researched: **segmental** variation
- **auditory** analysis: consonants and vowels
 - variable studies, e.g. Trudgill (1974)
 - quantitative differences correlating with:
 - sex/gender
 - age
 - ‘class’
 - ‘style’
 - ethnicity



Norwich (ng)

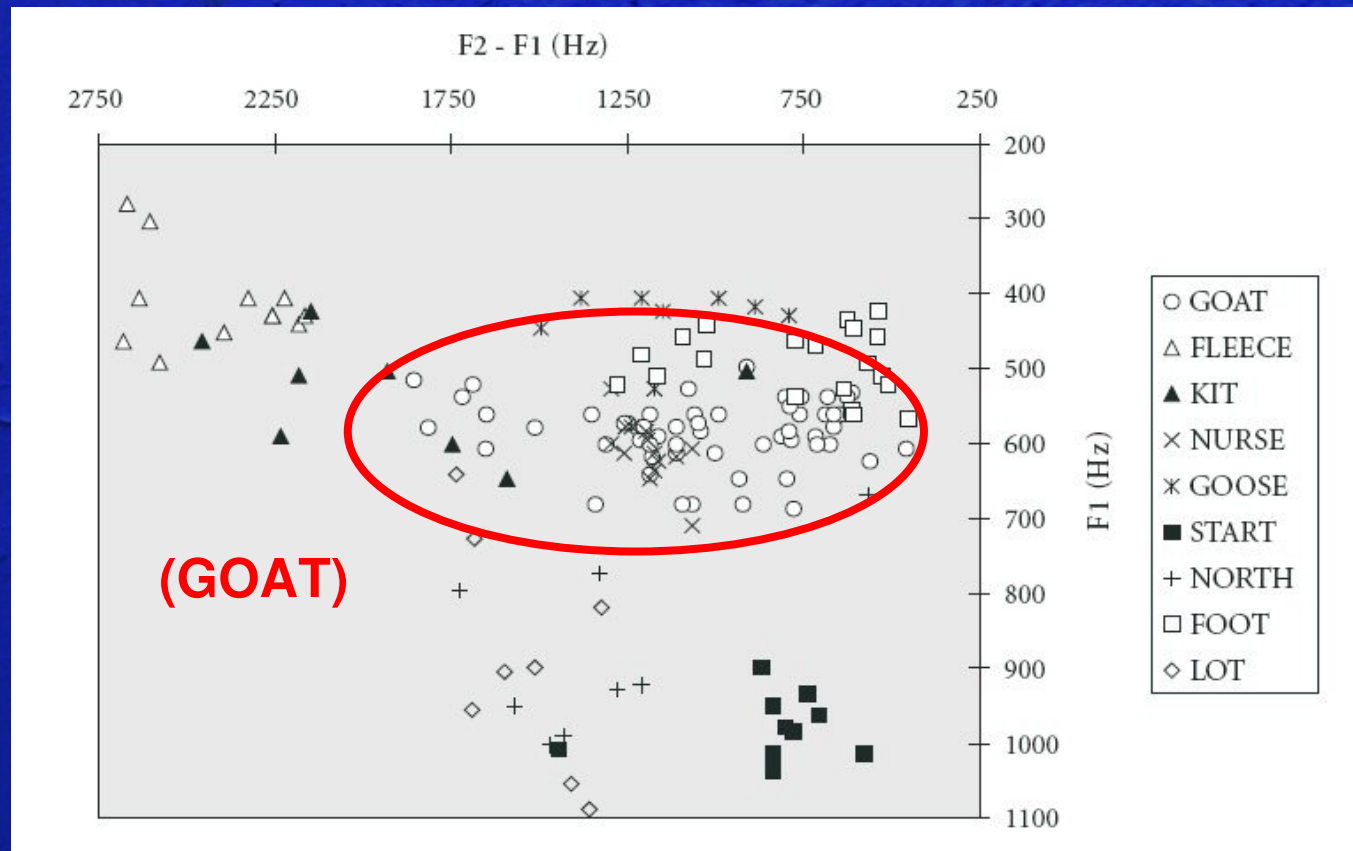
2.1 loci of variation: segments

- **acoustic analysis:**
 - mainly of stressed vowels
 - midpoint values of F1 and F2



2.1 loci of variation: segments

- fronting of Bradford (GOAT) (Watt & Tillotson 2001)



2.1.1 developing areas: segmental

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- consonants
 - formant analysis of /r, l/
 - Foulkes & Docherty (2000) etc

2.1.1 developing areas: segmental

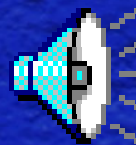
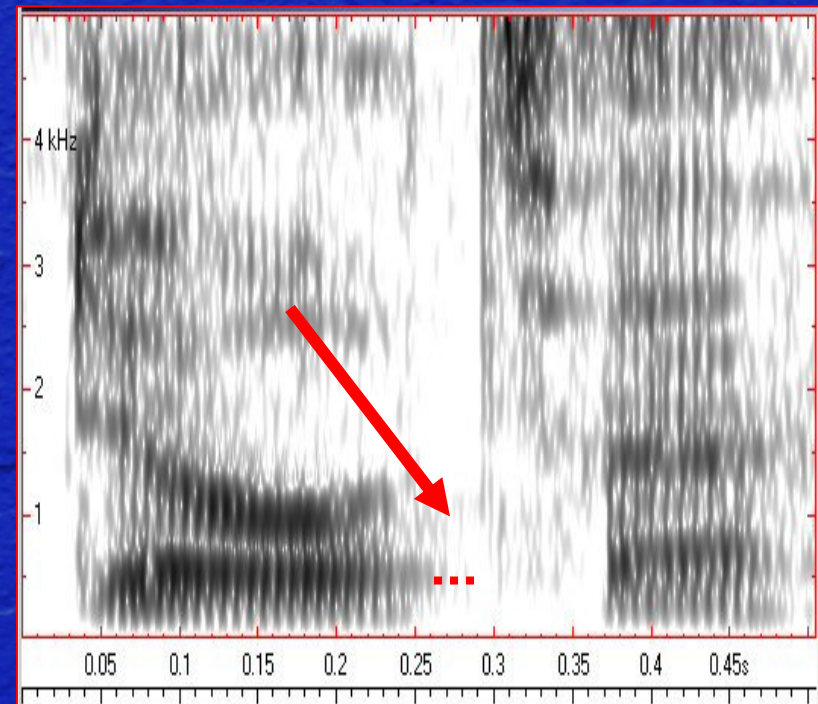
- consonants
 - formant analysis of /r, l/
 - Foulkes & Docherty (2000) etc
- other consonants less straightforward
 - more complex to capture essential properties
 - but see e.g. Stuart-Smith (in press) on [s]
 - **acoustic profiling** (Docherty & Foulkes 2005)

2.1.1 developing areas: segmental

- acoustic profiling
 - componential analysis of acoustic features
 - quantitative measurement where possible but not the sole aim

2.1.1 developing areas: segmental

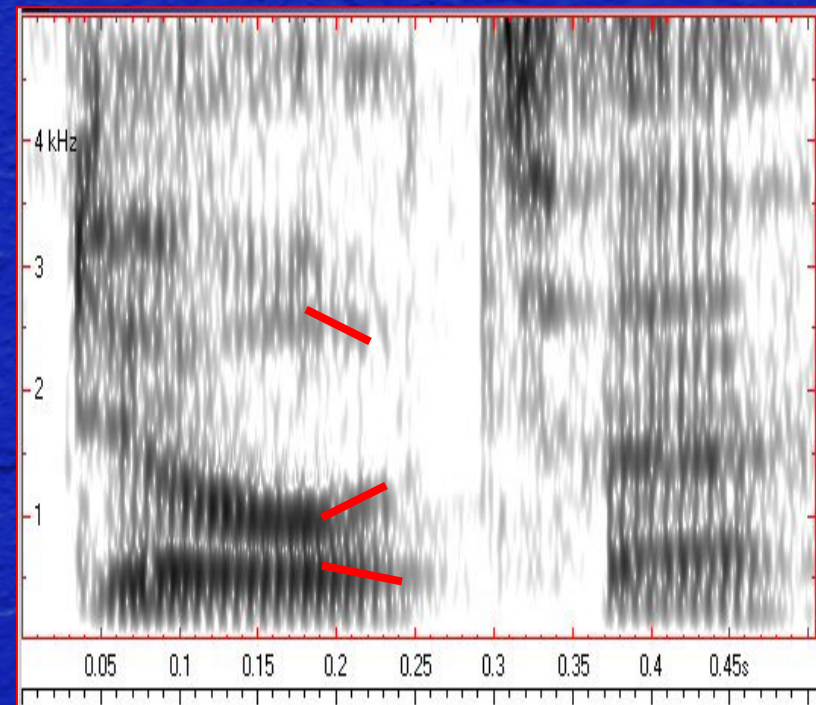
- key components for medial /p, t, k/
 - silent ‘stop gap’



46 ms

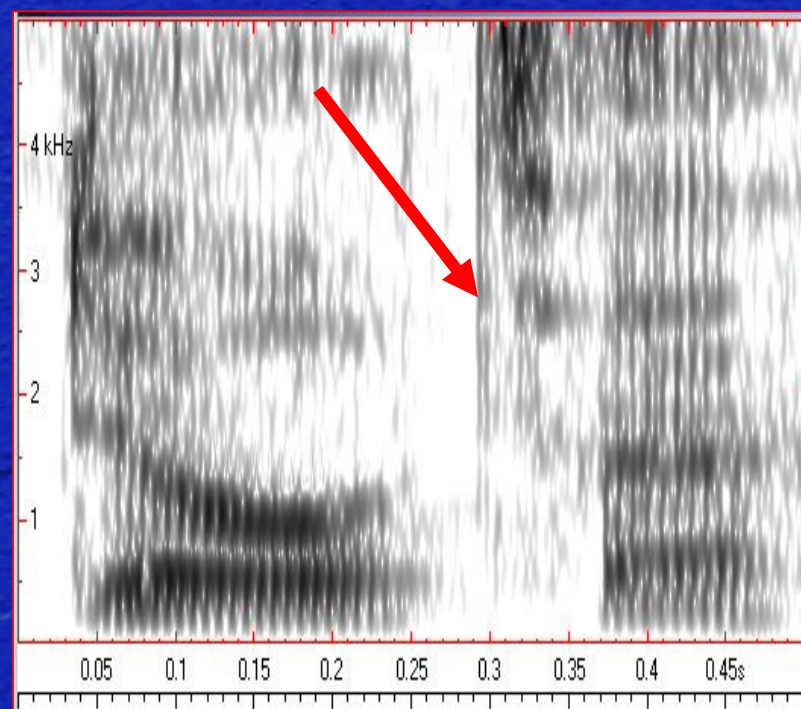
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 - transitions in adjacent vowels indicate oral gesture



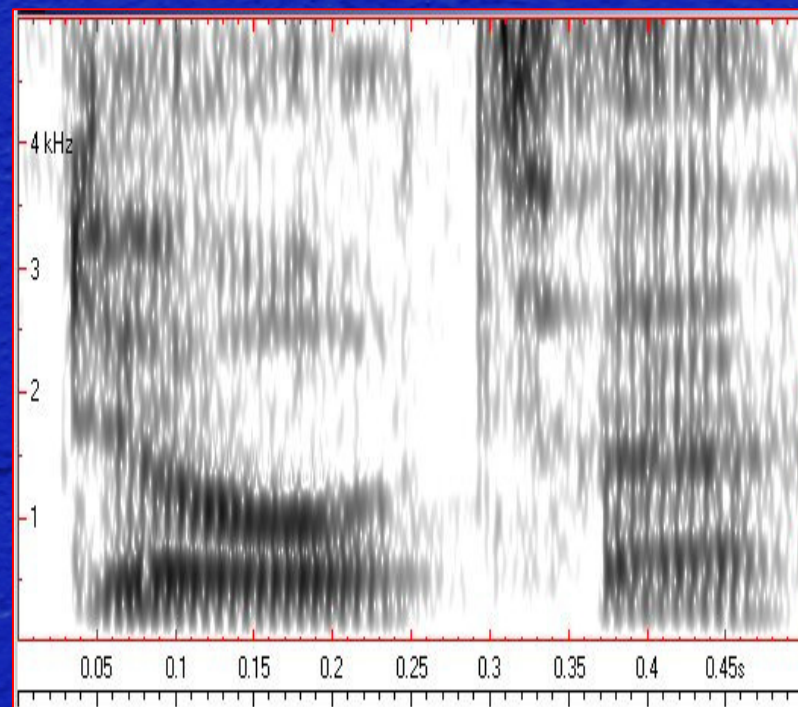
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 - transient (burst) indicates release of (oral) closure



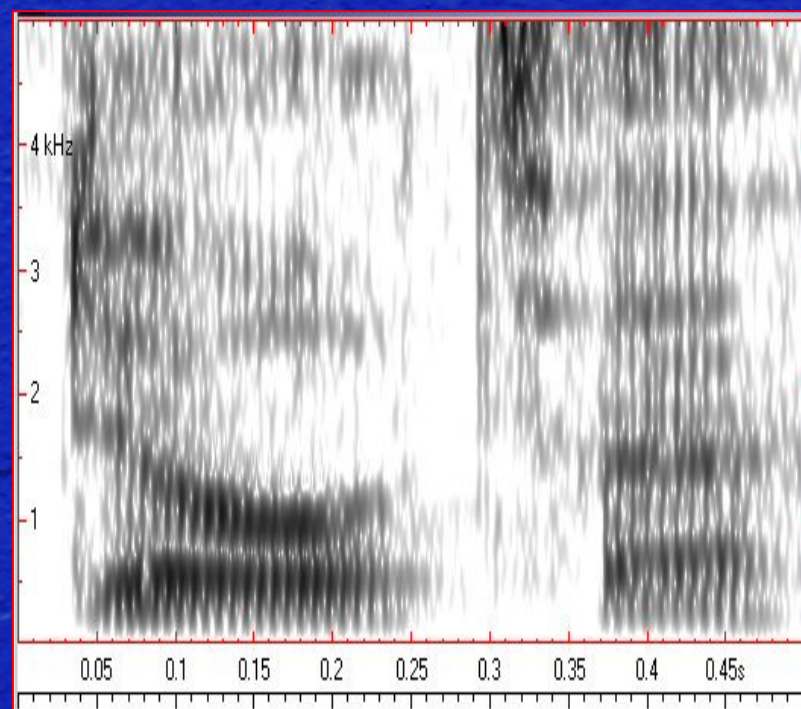
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 - (creaky voicing if glottal constriction)



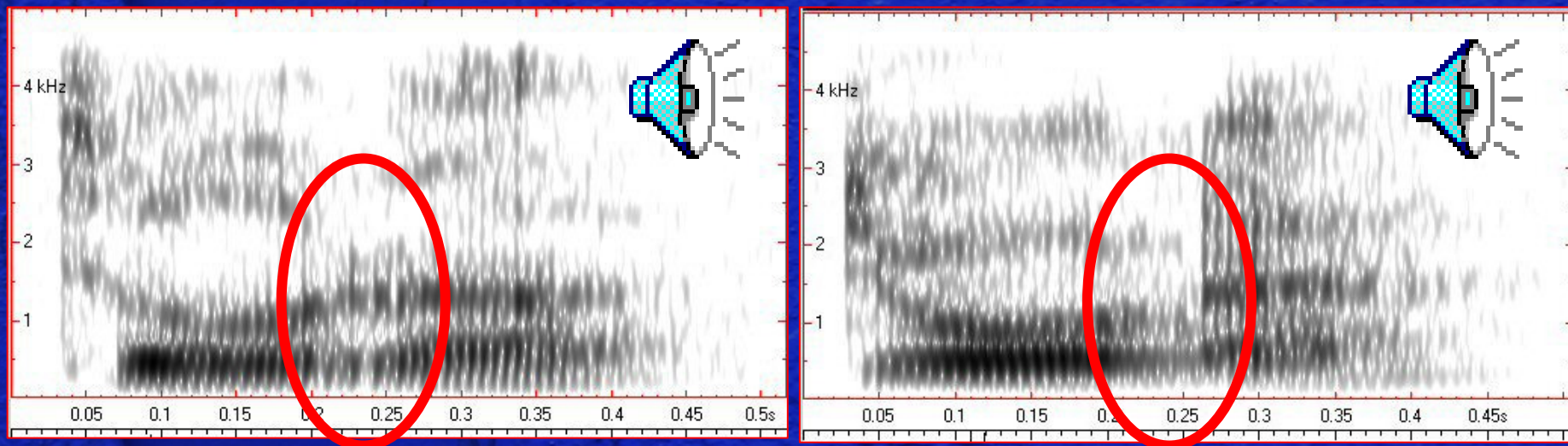
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- key components for medial /p, t, k/
- can assess **distribution of key components** independently or in combination



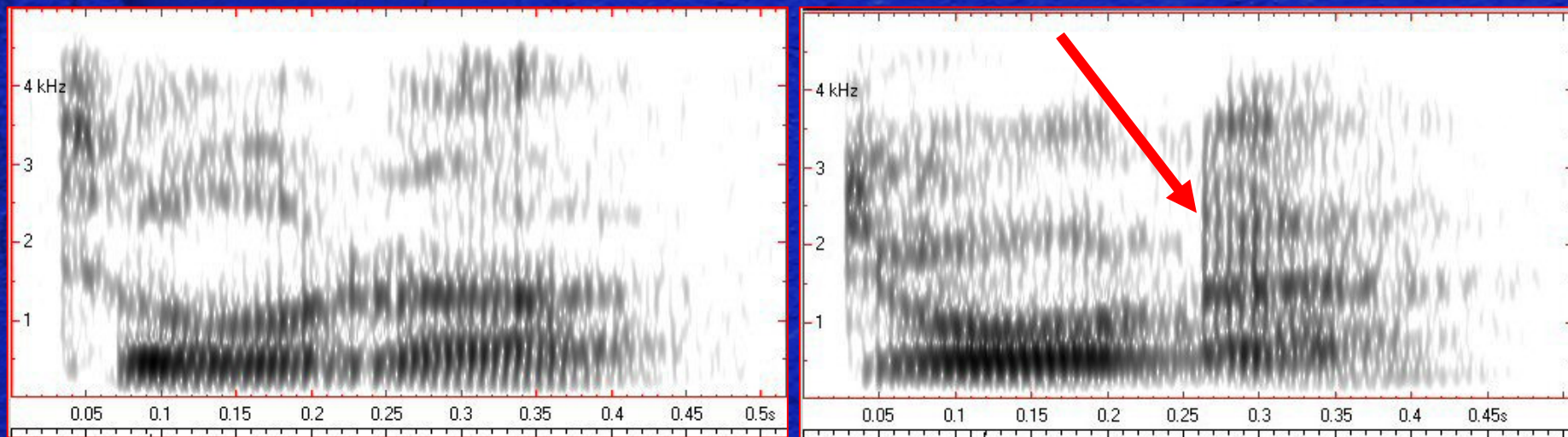
2.1.1 developing areas: segmental

- Newcastle data
 - very few silent stop gaps
 - lots of creaky voicing - glottal constriction



2.1.1 developing areas: segmental

- Newcastle data
 - differences in presence/absence of transient

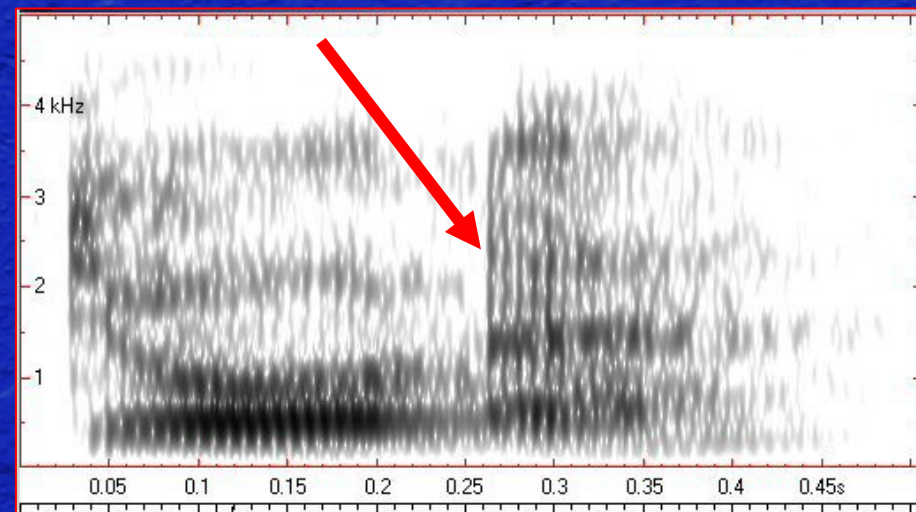


2.1.1 developing areas: segmental

- Newcastle data
 - differences in presence/absence of transient
 - transients sig. more common for **older males**

older males > 40%

other groups 11-23%

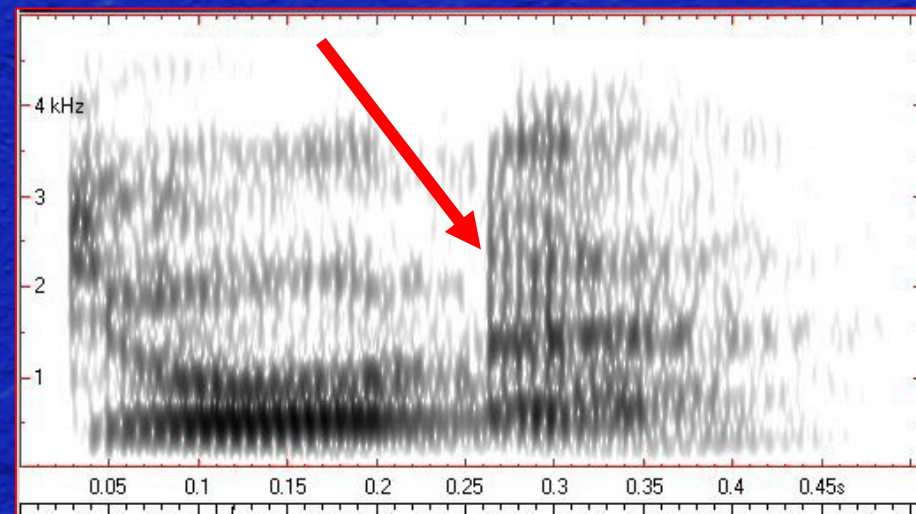


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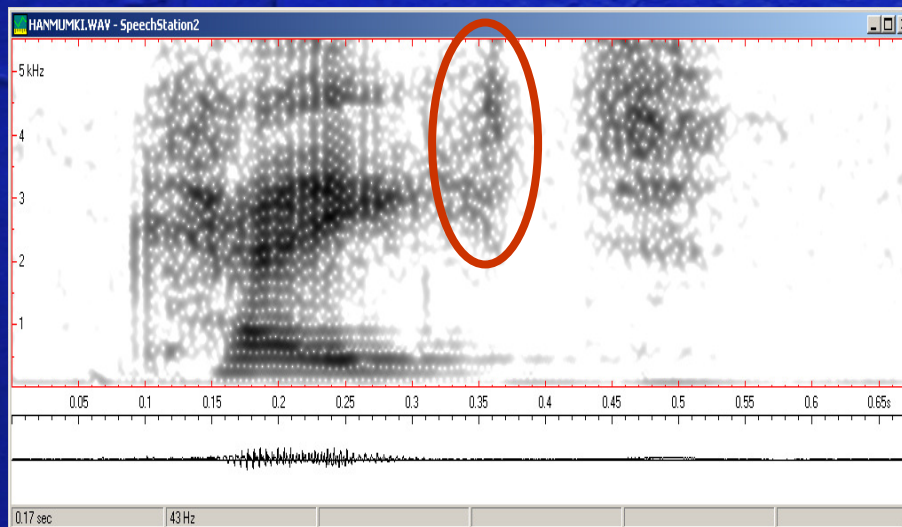
implies difference in
gestural coordination
(oral release after creak)

and/or gestural magnitude
(complete closure)



2.1.1 developing areas: segmental

- profiling method also used to assess children's acquisition of variable forms in Newcastle (Docherty, Foulkes, Tillotson & Watt in press)
- **pre-aspiration** of pre-pausal [-t]



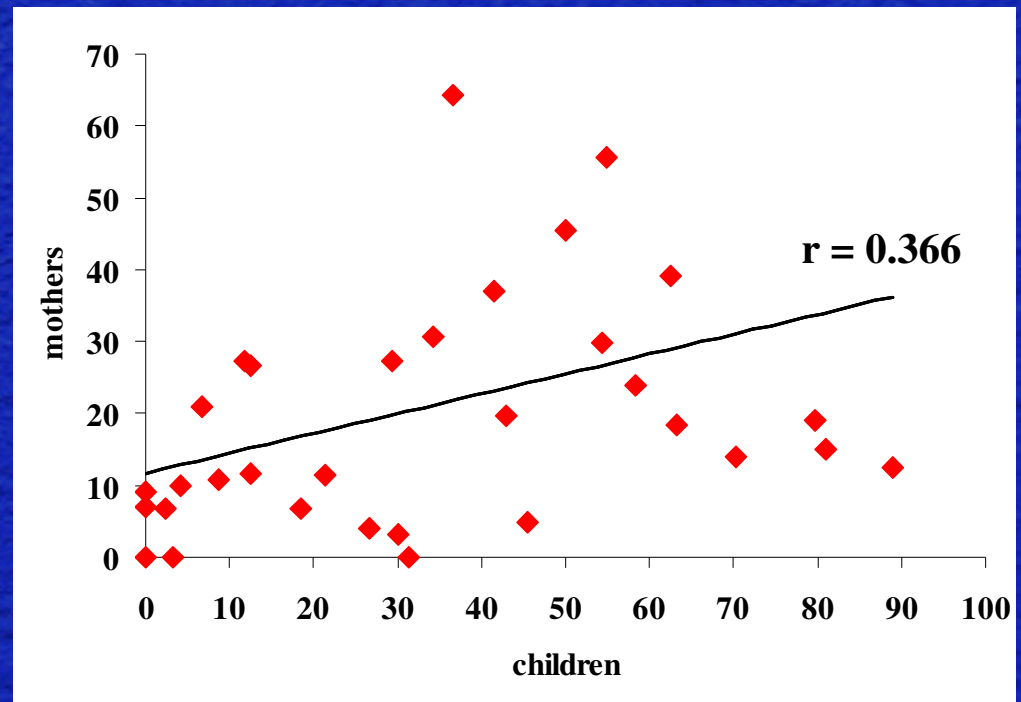
innovative form
young women

2.1.1 developing areas: segmental

- % pre-aspiration of pre-pausal [-t]

32 pairs

overall sig. correlation
between mother & child
($p < .05$)

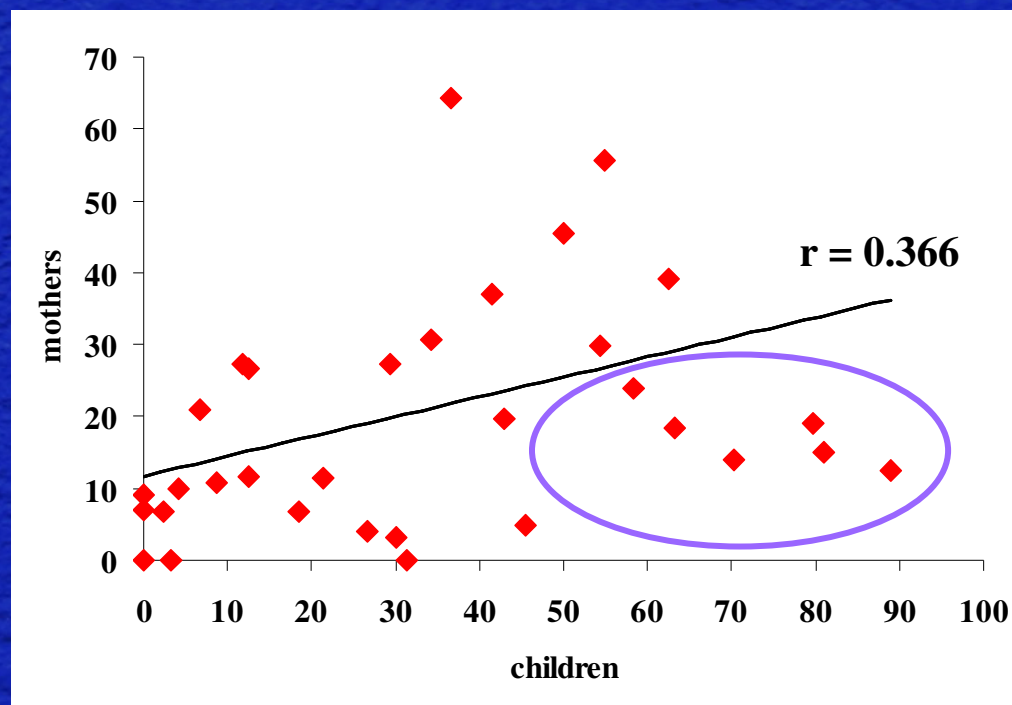


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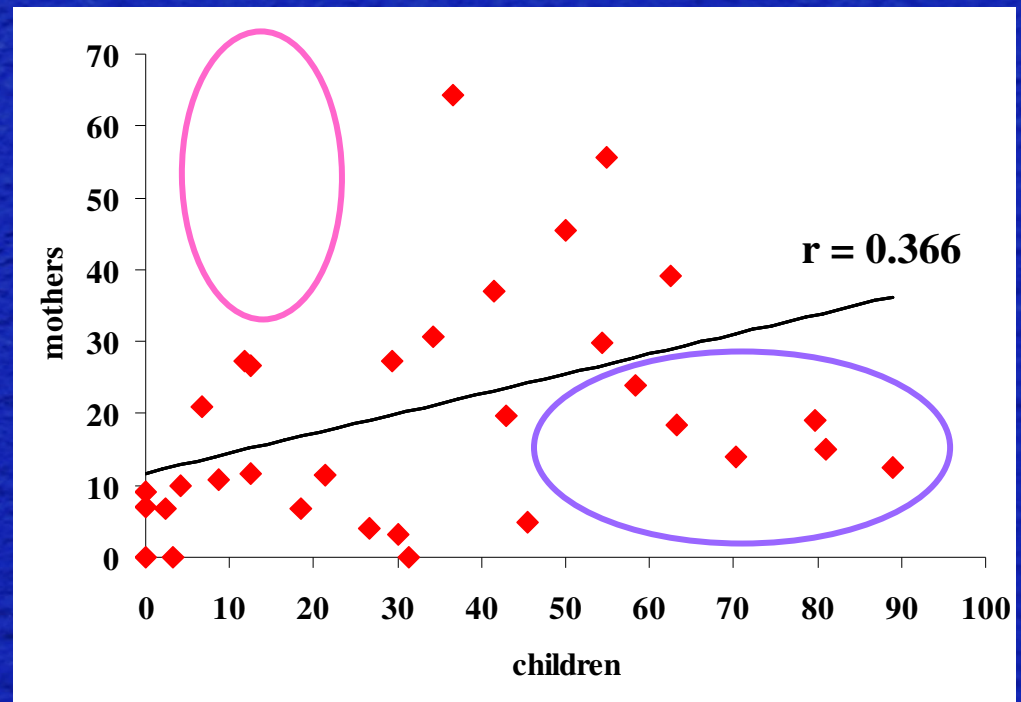


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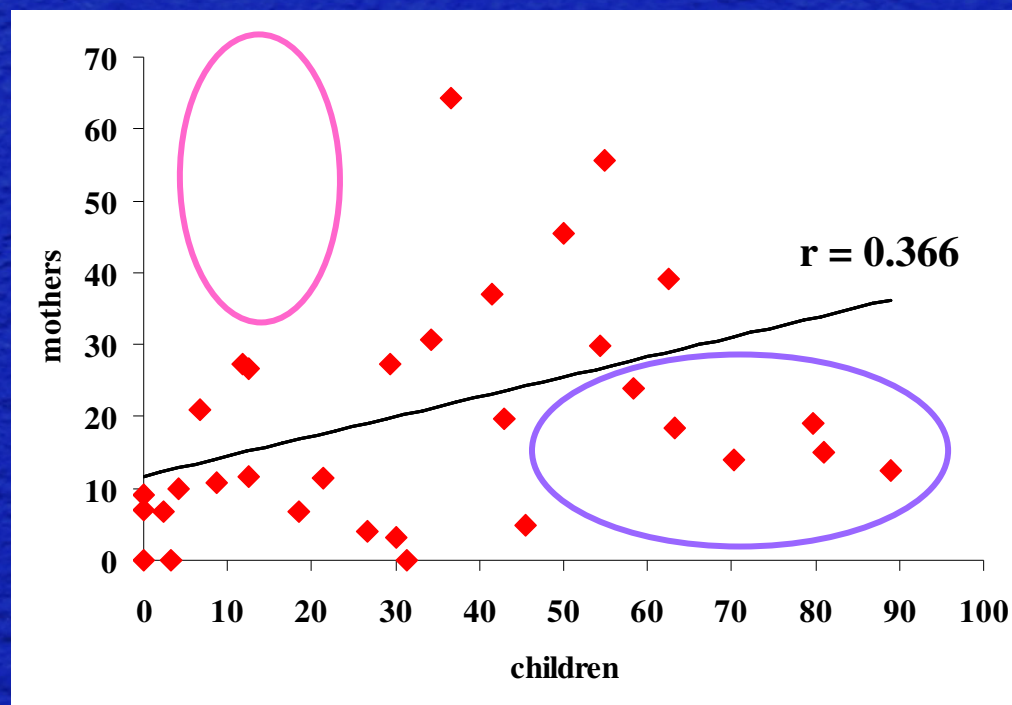


2.1.1 developing areas: segmental

- % pre-aspiration of pre-pausal [-t]

transmission of
innovative form

kids acquire even if
not from mother



2.1.1 developing areas: segmental

- other examples of ‘fine-grained’ variation correlating with social/regional variables
 - epenthetic stops (Fourakis & Port 1986)
 - rate of transition in diphthongs (Thomas 2000)
 - duration of VOT (Scobbie in press)

2.1.1 developing areas: segmental

- such examples show that socially-structured variation reaches down to very subtle levels of speech production
- interesting implications for:
 - variation & change
 - theoretical models of speech production
 - speech perception
 - acquisition
 - theoretical models of linguistic knowledge

2.1.1 developing areas: segmental

- many other issues in **L1 and L2 acquisition** (Khattab 2002, in press)
- **other formants** (e.g. Nolan 1983 on **F3**)
- **coarticulatory** effects (e.g. Nolan & Kerswill 1990)
- testing predictions of **phonological theory** (Honeybone 2001, Watson 2002 & this meeting)
- **unstressed vowels**
- other aspects of F1 and F2 e.g. **bandwidth**
- etc etc etc

2.2 loci of variation: suprasegmentals

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- less socio- work than on segmental topics

2.2 loci of variation: suprasegmentals

- but increasing work on aspects of **intonation**

2.2 loci of variation: suprasegmentals

- but increasing work on aspects of **intonation**
 - **regional** variation in contour types/‘tunes’
 - e.g. van Leyden (this meeting)
 - **social** variation
 - e.g. ‘uptalk’ in UK, US, Australia, NZ (Cruttenden 1997)
 - young and female, MC in UK, WC elsewhere
 - effects of ‘**style**’, e.g. narrative structure, interlocutor
 - e.g. ‘uptalk’, rises in Finnish (Ogden & Routarinne in press)

2.2 loci of variation: suprasegmentals

- voice quality & vocal setting
 - Henton & Bladon (1988, RP)
 - Esling (1991, Vancouver)
 - Stuart-Smith (1999, Glasgow)
 - problem of complexity of analysis method

2.2 loci of variation: suprasegmentals

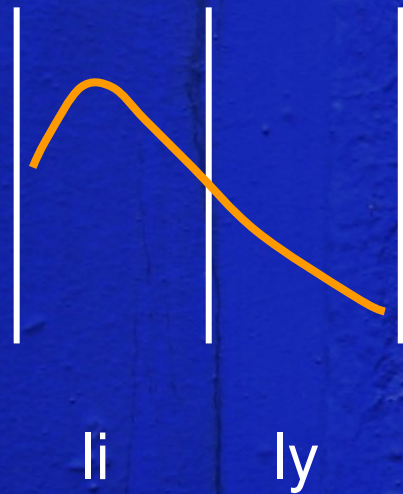
- **rhythm**

- Low, Grabe & Nolan (2000, Singapore)
- Deterding (2001, Singapore & RP)
- Carter (2004, Spanish L1/English L2 learners)
- White & Matthys (this meeting, UK)

2.2 loci of variation: suprasegmentals

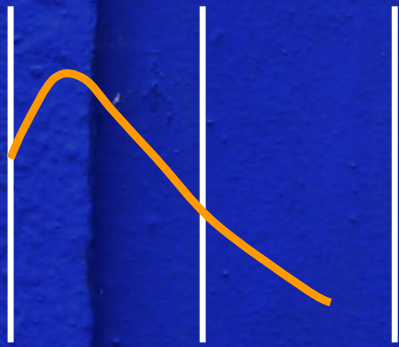
- **tonal alignment**
 - location of peak pitch movement
 - Nolan & Farrar (1999, UK dialects)
 - Nolan (2002, cross-speaker variation)

tonal alignment



schematic F0 trace for **lily**

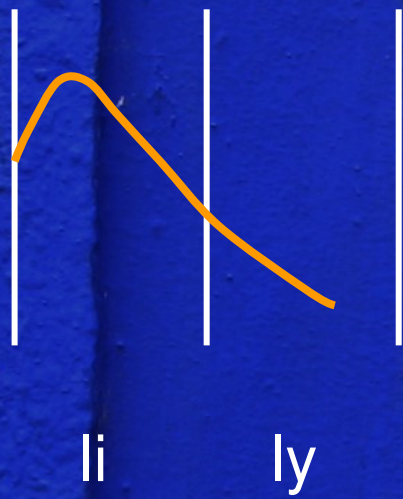
stress on 1st syllable



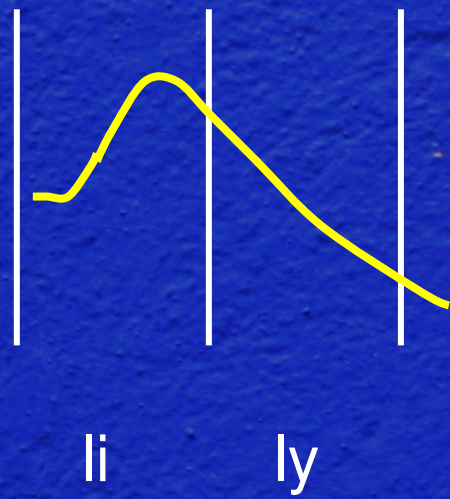
li

ly

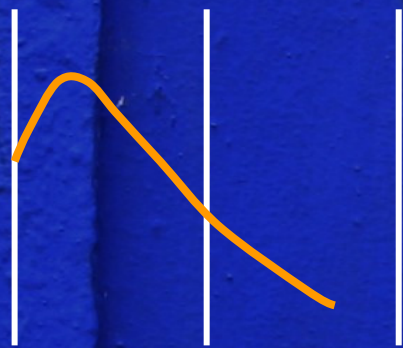
early peak



early peak



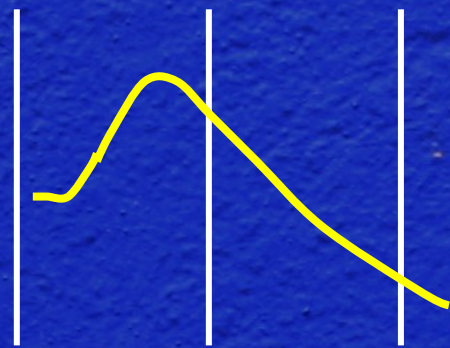
late peak



li

ly

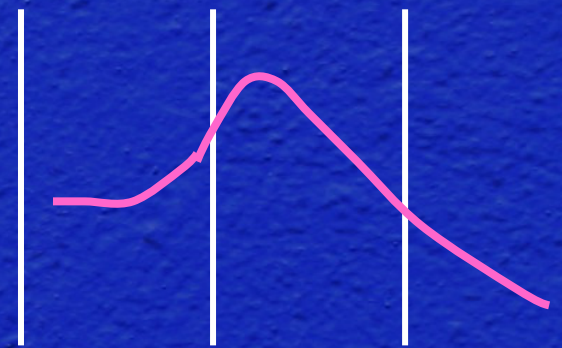
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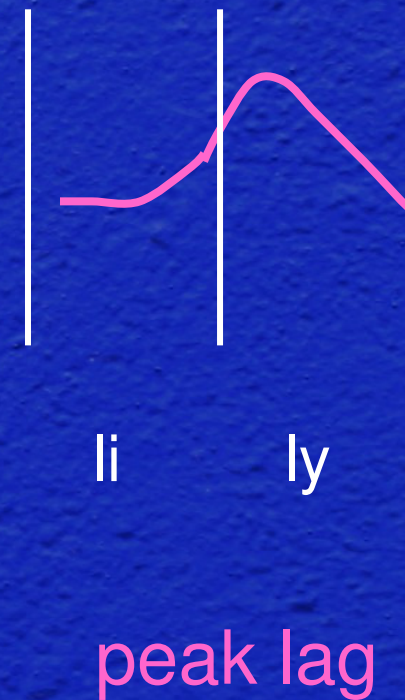
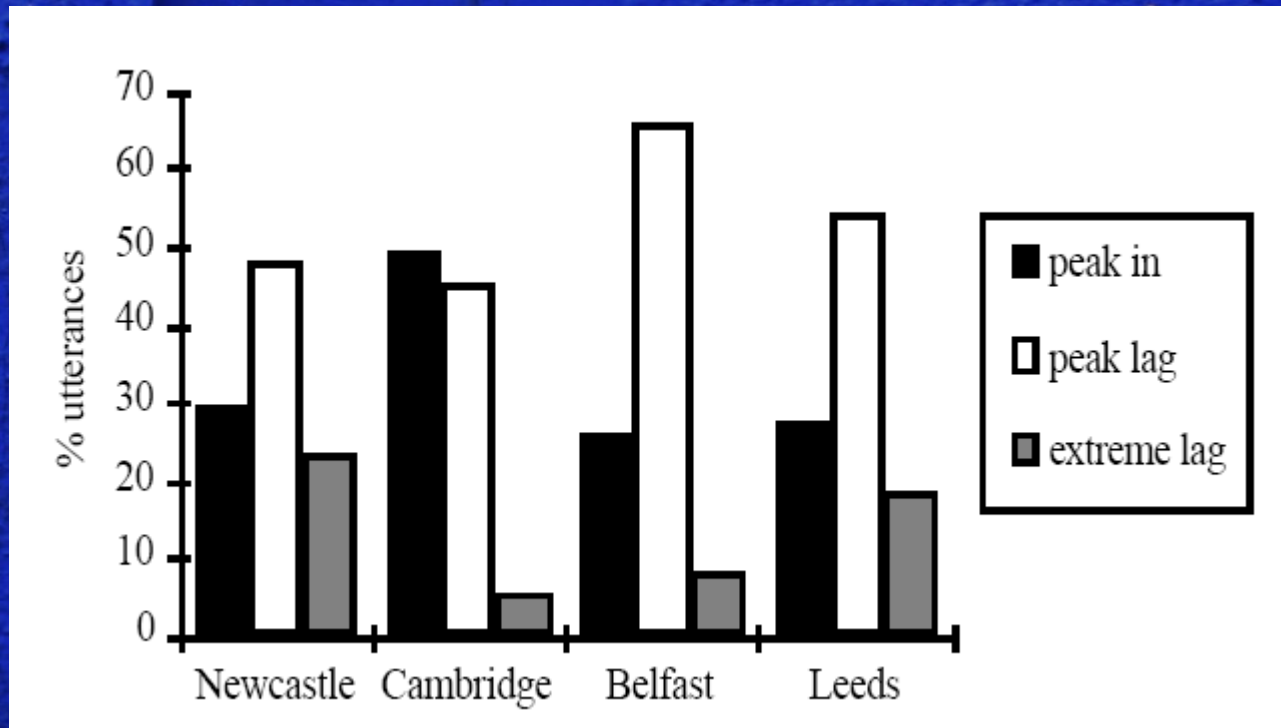
late peak



li

ly

peak lag



- significant dialectal variation
 - Nolan & Farrar (1999)

2.3 further openings

- **sources** of socially-structured variation
 - ‘style’
 - type of talk
 - addressee, topic, setting
 - collaborative structuring (Local 2003)
 - medium of transmission, e.g. telephone
 - **ethnicity**
 - little work in UK (but see Heselwood & McChrystal 2000, Khan 2003, Fox in progress)

2.3 further openings

- developing **methods**:
 - direct articulatory investigations
 - especially to investigate **dynamic** action
- **ultrasound**
 - Scobbie & Stuart-Smith this meeting
 - Gick et al (2004), Wilson et al (2005): articulatory setting in French & English speakers, E-F bilinguals
- **EMA** (electromagnetic articulography)
- **MRI** (magnetic resonance imaging)

3. Speech perception

3.1 perception & sociophonetics

- Thomas (2002): excellent review of research
 - identifying social or regional background of speakers
 - attitudes to variable forms
 - effects of native dialect on perception
 - perception of ongoing sound changes

3.1 perception & sociophonetics

- social categories affect linguistic processing, e.g. phonological categorisation
 - Strand (1999), Niedzielski (1999)
 - categorisation of synthetic [s] and [ʃ]
 - listeners saw male or female face (but same signal)
 - perception is not automatic or universal
 - processing is tuned to perceived sex of speaker

3.1 perception & sociophonetics

- experience of **individual speaker** aids:
 - lexical access
 - Hawkins & Smith (2001), Hawkins (2003)
 - L2 phonological learning
 - Lively, Logan & Pisoni (1993)

3.1 perception & sociophonetics

- such evidence suggests that speech processing is not carried out by a language module devoid of 'social' information
- thus draws into question traditional models which partition linguistic and non-linguistic knowledge *a priori*

3.2 developing areas: perception

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- perception of indexicality

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- perception of indexicality
 - what phon parameters are noticeable?
 - what do they signal to listeners?
 - how much material is needed for a judgement?

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- perception of indexicality
 - what phon parameters are noticeable?
 - what do they signal to listeners?
 - how much material is needed for a judgement?
- example:
 - **Newcastle** work identified **gender-correlated** patterns in variants of (t)
 - do **lay listeners** make same associations between variants and gender?

3.2 developing areas: perception

- pilot experiment (Docherty, Foulkes & Khattab 2004):
 - exploited inherent androgyny of children's voices
 - played short samples
 - 2 listener groups: **local** (20) and **non-local** (35)
 - task: boy or girl?
 - example stimulus:



3.2 developing areas: perception

- predictions based on production data:
 - statistical associations of

medial (p,t,k)

glottal

male

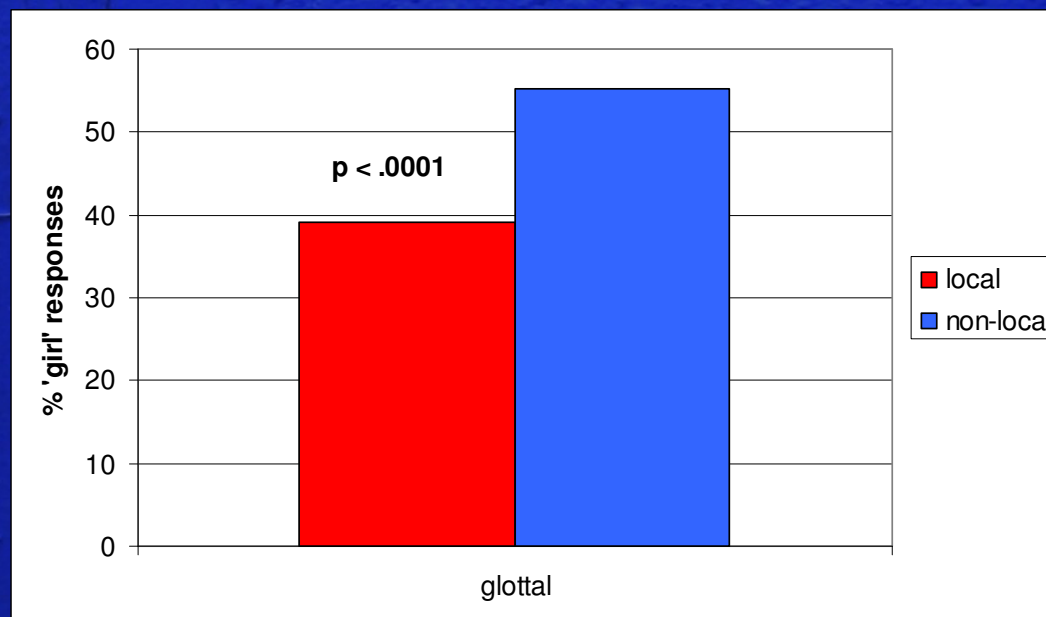
pre-pausal (p,t,k)

pre-aspirated

female

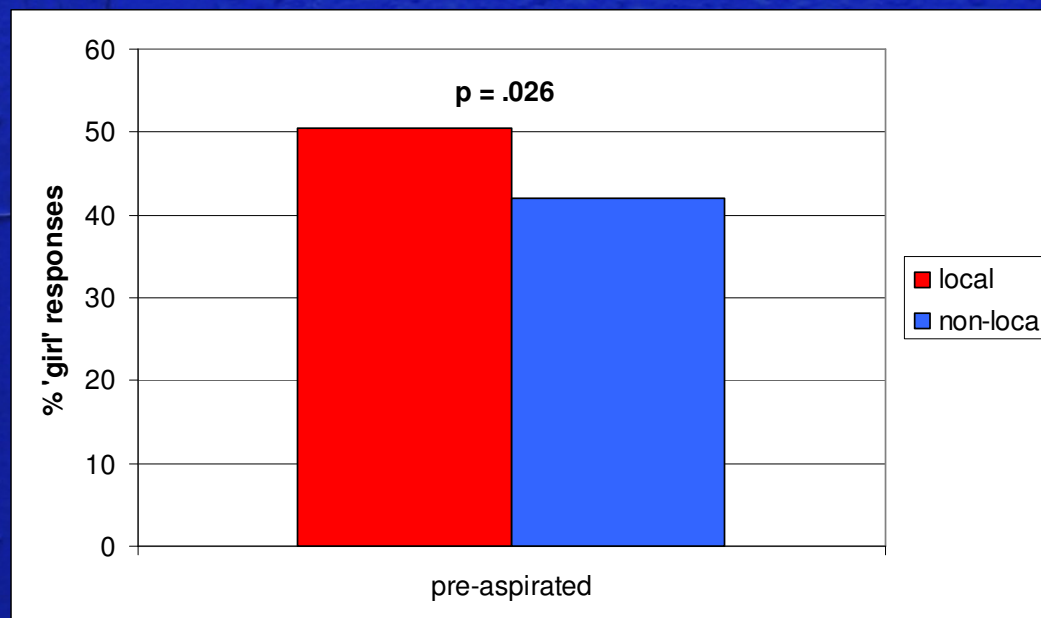
3.2 developing areas: perception

- results: medial (p t k), glottal tokens
 - 'girl' responses lower for locals
 - predicted : glottals associated with males



3.2 developing areas: perception

- results: final (p t k), pre-aspirated tokens
 - more 'girl' responses by local listeners
 - predicted: pre-aspiration associated with females



3.2 developing areas: perception

- very much pilot work so far
- but some evidence that linguists' observations tally with real people's interpretations of indexicality

5. Theoretical implications

5.1 sociolinguistic theory

- origins and spread of change
 - chain shifting etc
 - social motivations
 - evaluation of variants
 - network structure, market values etc
- e.g. new dialect formation
 - frequency & status effects
 - role of peers especially in adolescence

5.2 models of cognitive structures

- ‘mainstream’ linguistic theory
 - nature of phonological & lexical structures
 - storage and computation
- Chomskyan (and anti-Chomskyan) tradition:
 - social component as a bolt-on
 - not linguistic knowledge *per se*
 - e.g. variable rules, variable OT constraint rankings

5.2 models of cognitive structures

- an alternative: **exemplar model** (Johnson 1997)
 - developed via psycholinguistics, speech perception
 - allows social & indexical information to remain integral part of linguistic knowledge
 - not stripped away in acquisition or perception
 - not overlaid on ‘basic’ linguistic information in speech planning

exemplar model

– cognitive form of a word is not a minimal string like

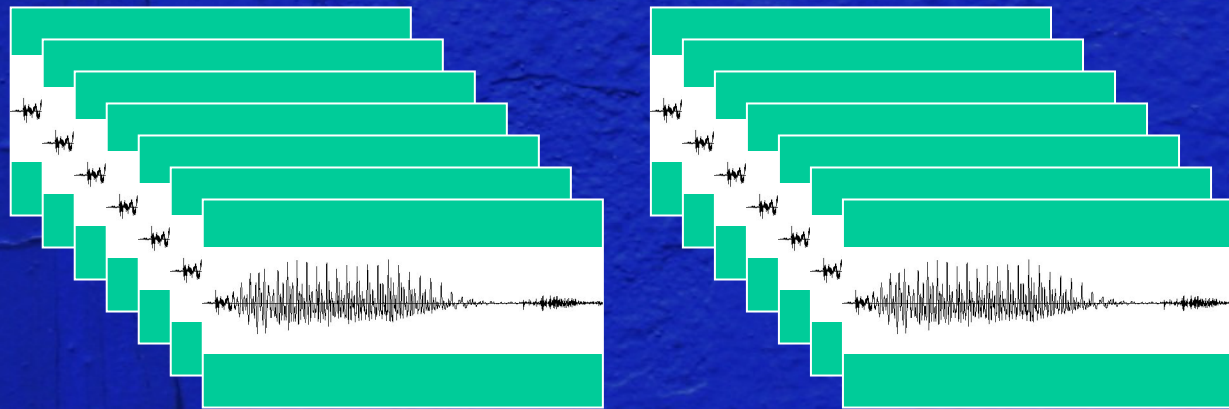
/kat/

exemplar model

- cognitive form of a word is not a minimal string like

/kat/

- instead, it consists of **all exemplars** of that word the individual has heard and uttered, in acoustic form

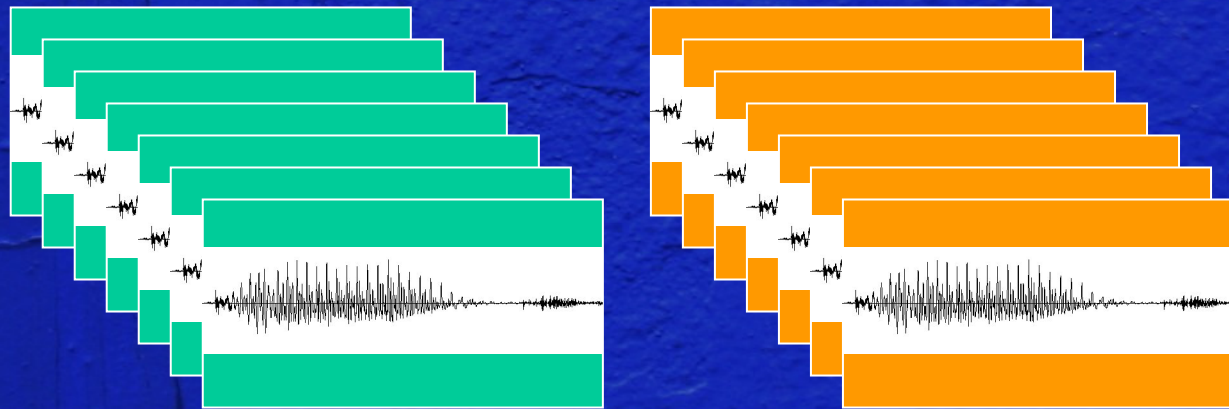


- variation is thus stored within each exemplar

exemplar model

- knowledge of **phonological** variation emerges through **clustering** of similar forms
- e.g. exemplars ending in **[t]** versus **glottal stop**

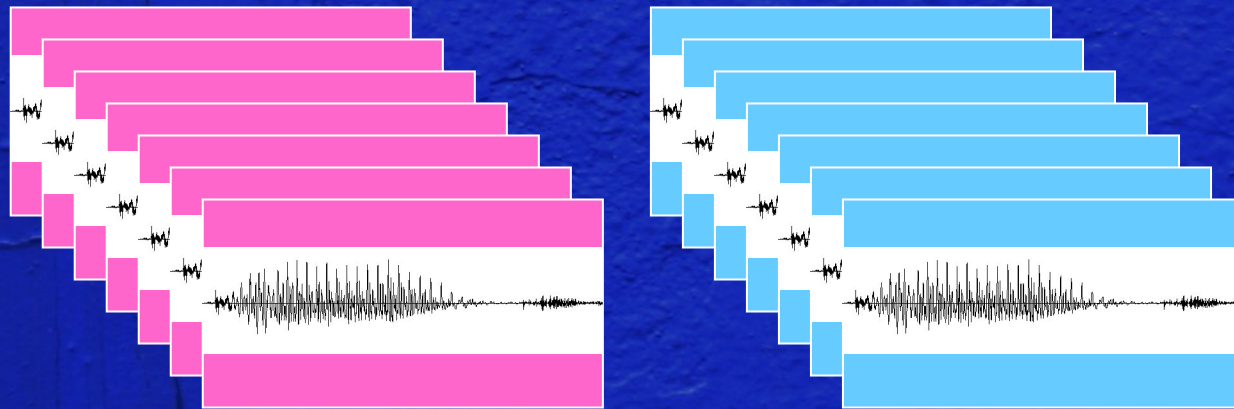
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exemplar model

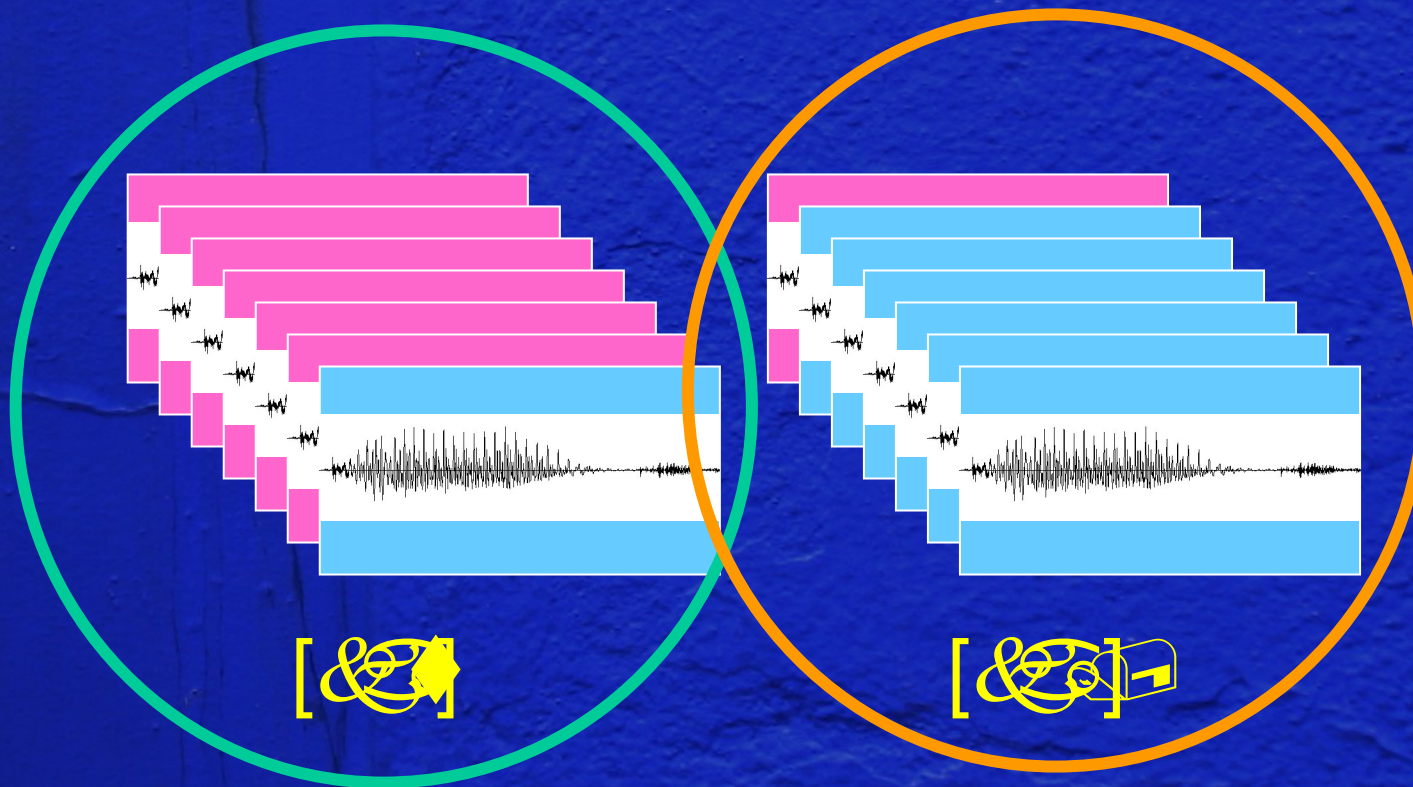
- knowledge of **social** differences emerges through same process
- e.g. exemplars by **females** versus **males**

/kat/



exemplar model

- knowledge of **socially-structured variation** emerges where social and linguistic differences **coincide**
- e.g. **glottal stop** exemplars & **males**



exemplar model: a problem issue

- **speech production** (Pierrehumbert 2003)
 - production form is based on ‘average’ of exemplars in store
 - mean?... intermediate phonetic values
 - median?... form in greatest frequency

exemplar model: a problem issue

- **speech production** (Pierrehumbert 2003)
 - production form is based on ‘average’ of exemplars in store
 - mean?... intermediate phonetic values
 - median?... form in greatest frequency
- mediated by **weighting** (or ‘bias’)
 - preference for certain forms tagged for ‘style’, gender, etc, even if those forms are found in low frequency
 - but how and when does weighting emerge?

exemplar model

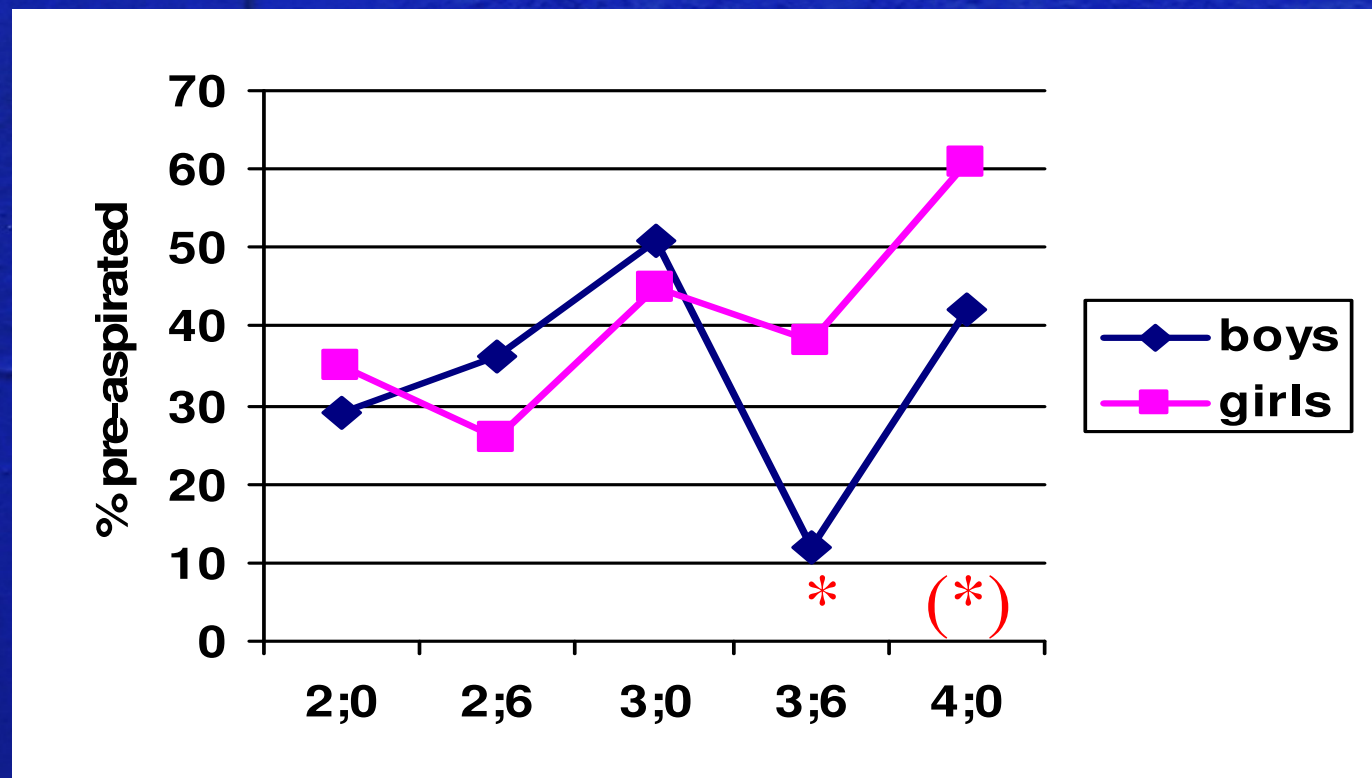
- socio- work is perfectly positioned to contribute by explaining:
 - the range of social motivations for usage of certain forms
 - why individuals pay greater/lesser attention to forms

exemplar model

- e.g. a boy in L1 acquisition is likely to hear most input from adult females
- thus his exemplar store will contain a high frequency of 'female'-type exemplars
- but he must learn to add weight to socially salient male forms to conform to social expectations
- when and how does this happen?

exemplar model

- evidence that children start to differentiate in phonological gender-patterns after c. 3 years (Foulkes & Docherty in press, cf. Roberts 1997)



exemplar model

- evidence that children start to differentiate in phonological gender-patterns after c. 3 years (Foulkes & Docherty in press, cf. Roberts 1997)
- implication:
 - major restructuring of exemplars via change in weighting at 3 years+
 - i.e. linguistic knowledge is reshaped through development of social experience and growing awareness of indexicality
 - linguistic knowledge is shaped by personal experience

6. Applications

6.1 motivations

- data, descriptions, theories from sociophonetic work inform a wide range of applied disciplines
 - in some cases we have a duty to contribute (Labov's **principle of debt incurred**)
 - in other cases 'users' would be a good source of income for researchers, students, graduates

6.1 motivations

- data, descriptions, theories from sociophonetic work inform a wide range of applied disciplines
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 - in other cases 'users' would be a good source of income for researchers, students, graduates (Foulkes's **principle of debt deferred**)



6.2 speech pathology

- distinguish genuine pathology from local norms to inform diagnosis and treatment
 - see Ball (ed.) (2005)
- descriptive accounts of local varieties crucial
- establish ongoing educational & research links with practising speech therapists

6.3 education & policy

- assess educational need via comparison of standard form/educational medium versus language/dialect of student
 - see Wolfram & Schilling-Estes (2006: ch 10)

6.4 speech technology

- speech technology
 - natural and acceptable synthetic speech
 - fully adequate speech recognition systems
- descriptive data on variation is essential
- experimental tests of e.g. comprehensibility and aesthetic evaluation
 - Hoequist & Nolan (1991), Laver (1995)

6.5 commerce

- advertising, marketing, PR, customer relations
 - testing attitudes to speech and language
 - comprehensibility & appropriateness of verbal and written texts
 - effects of texts on workers
 - e.g. **call centres** (Orr this meeting, Mirchandani 2004)
 - see also Bell (1991: 135ff)

6.6 forensic speaker ID

- compare recordings to assess compatibility between **criminal** and **suspect** (Nolan 1997)

[sound files removed from version at UKLVC5]

- assessing idiosyncrasy is the key
 - presence of rare features
 - clustering of distinctive features

6.6 forensic speaker ID

- descriptive accounts vital
 - identification of key variables in a given dialect
 - parameters of variation in individuals & groups
 - distribution of key variables across populations
- further sources of variation
 - lay recognition of individuals
 - environment (Lombard reflex etc)
 - medium (phone, shouting etc)
 - external influences (stress, alcohol, drugs)

7. Concluding comments

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- I have tried to highlight the breadth of potential research in sociophonetics
- to recap, sociophonetics is about:
 - sources, loci & parameters of variation
 - explaining acquisition, storage & processing
 - developing theoretical models
 - informing applied disciplines

7. Concluding comments

- in my opinion, the theoretical issues are the most important, especially with respect to theories of linguistic knowledge
 - variation is a defining feature of human speech and language
 - variation is a design feature not a design flaw
 - theoretical models need to incorporate variation as a fundamental, not an afterthought

7. Concluding comments

- Labov has said that he long resisted the term ‘sociolinguistic’ since he found it hard to conceive of a linguistics that isn’t social

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- Labov has said that he long resisted the term ‘sociolinguistic’ since he found it hard to conceive of a linguistics that isn’t social
- it is just as hard to conceive of a phonetics and phonology that aren’t social

7. Concluding comments

- sociophonetics is a rapidly emerging discipline, gaining independence from its 'parents'
 - increase in job adverts specifying sociophonetics
 - emergence of courses at Essex, York, North Carolina, etc
 - great expansion of papers at ICPPhS
 - Docherty plenaries at ICPPhS (2003) and Laboratory Phonology (2004)
 - special edition of *Journal of Phonetics* (2005)

7. Concluding comments

- sociophonetics is a rapidly emerging discipline, gaining independence from its 'parents'
- the influence & power of sociophonetics should in turn continue to grow

7. Concluding comments

- so get to it!

7. Concluding comments

- so get to it!
- but perhaps something else first....



cheers

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