

Studies from the periphery of language

Why phonetics is more than larynx-to-lips

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Conventional assumptions about speech

CONSONANTS (PHONOLOGY)											© 2005 IPA	
	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal	
Plosive	p b			t d		ʈ ɖ	c ɟ	k g	q ɢ		ʔ	
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ			
Trill	ʙ			r				ʀ				
Tap or Flap			ⱱ			ɽ						
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʈ ɖ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ	
Lateral fricative				ɬ ɮ								
Approximant		ʋ		ɹ		ɻ	j	ɰ				
Lateral approximant				l		ɭ	ʎ	ʟ				

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

CONSONANTS (NON-POLYMONIC)			VOWELS		
Clicks	Voiced implosives	Ejectives			
<p>ᵀ Bilabial</p> <p>ᵀ̥ Dental</p> <p>ᵀ̥̥ (Postalveolar)</p> <p>ᵀ̥̥̥ Palatoalveolar</p> <p>ᵀ̥̥̥̥ Alveolar lateral</p>	<p>ᵇ Bilabial</p> <p>ᵇ̥ Dental/alveolar</p> <p>ᵇ̥̥ Palatal</p> <p>ᵇ̥̥̥ Velar</p> <p>ᵇ̥̥̥̥ Uvular</p>	<p>ʼ Examples:</p> <p>ᵀ̥̥̥̥ Bilabial</p> <p>ᵀ̥̥̥̥̥ Dental/alveolar</p> <p>ᵀ̥̥̥̥̥̥ Velar</p> <p>ᵀ̥̥̥̥̥̥̥ Uvular</p> <p>ᵀ̥̥̥̥̥̥̥̥ Alveolar fricative</p>	<p>Front</p> <p>Close</p> <p>Close-mid</p> <p>Open-mid</p>	<p>Central</p> <p>ɪ ʏ</p> <p>ɘ ɵ</p> <p>ɜ̥ ɞ̥</p>	<p>Back</p> <p>u ʊ</p> <p>ɤ ɐ</p> <p>ɔ̥ ɔ̥̥</p>

OTHER SYMBOLS

ʌ	Voiceless labial-velar fricative	ʑ	Alveolo-palatal fricatives
w	Voiced labial-velar approximant	ɺ	Voiced alveolar lateral flap
ɥ	Voiced labial-palatal approximant	ɥ	Simultaneous ɥ and x
h	Voiceless epiglottal fricative		
ʕ	Voiced epiglottal fricative		
ʕ	Epiglottal plosive		

Affricates and double articulations can be represented by two symbols joined by a tie bar if necessary.

Open

a • e ——— d • D

Where symbols appear in pairs, the one
to the right represents a rounded vowel.

SUPRASEGMENTALS

' Primary stress
, Secondary stress
, , founə'tʃən
' ə'

k^ˆp t̩s

DIACRITICS Diacritics may be placed above a symbol with a descender, e.g. $\dot{\eta}$

✓	Vowelless	n d	✓	Really vowelless	b a	✓	Denial	t d
✓	Vowelless	s t	✓	Crabbing vowelless	b a	✓	Aspiral	t d
✓	Aspirated	t dh	✓	Crabbing vowelless	t d	✓	Laminal	t d
✓	Mouth rounded	ɔ	✓	Labiodental	tʷ dʷ	✓	Nasalized	ẽ
✓	Mouth rounded	ɔ	✓	Labiodental	tʷ dʷ	✓	Nasal release	d̥
✓	Advanced	u	✓	Vowelless	tʰ dʰ	✓	Lateral release	d̥
✓	Retracted	ẽ	✓	Pharyngealized	t̤ d̤	✓	No audible release	d̥
✓	Contrastive	ẽ	✓	Vowelless or pharyngealized	t̤			
✓	Mid-centralized	ẽ	✓	Rasped	ç	✓	(= vowelless alveolar fricative)	
✓	Syllabic	ɲ	✓	Low-tongued	ɟ	✓	(= vowelless bilabial approximant)	
✓	Non-syllabic	ɲ	✓	Advanced Tongue Root	ɣ			
✓	Rhoticity	ɣ ɹ	✓	Retracted Tongue Root	ɣ			

Where symbols appear in pairs, the one to the right represents a rounded vowel.

SUPRASEGMENTALS

ˈ Primary stress
ˌ Secondary stress
ˈ foundəˈtʃən

'	Half-long	e'
---	-----------	----

- Extra-short *ě*
- Minor (foot) group
- Major (intonation) group
- Syllable break *ji.ækt*
- Linking (absence of a break)

TONES AND WORD ACCENTS

LEVEL	CONTOUR
6-7 Extra	8-4 Rising

e _{or}	1	high	e _{or}	1	rising
é	1	High	ê	1	Falling

\bar{e}	Mid	\tilde{e}	High rising
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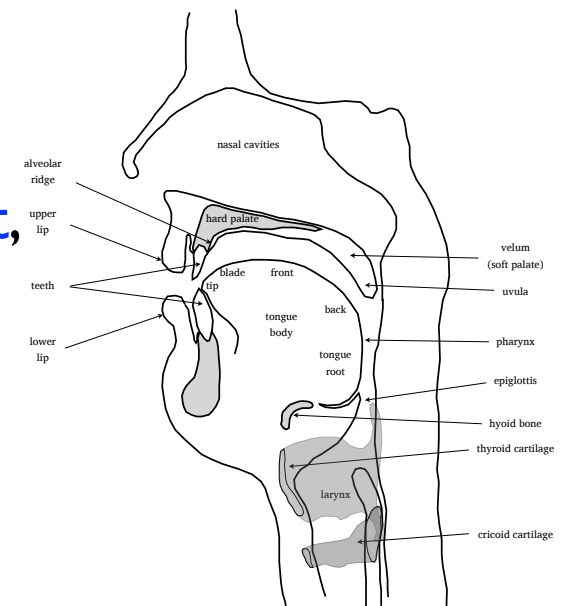
\hat{e}	\downarrow Low	\hat{e}	\nearrow Low rising
\tilde{e}	\rightarrow Falling	\tilde{e}	\searrow Rising

e	Extra low	e	Rising-falling
+		+	

↓	Downstep	↗	Global rise
↑	Uplift	↘	Global fall

100

- Sounds have linguistic (especially *lexical*) value
- Sound types = consonant, vowel, suprasegmental (under-theorised on IPA chart)
- Speech is made in the range: larynx to lips/ nostrils



Outline:

Conventional assumptions about speech can be challenged:

1. Issues of modality.
2. The prosody/segment division accounts poorly for many kinds of meaning.
3. Some sounds are 'in' speech but not 'of' it.

I. Language and modality

I.I. Speech and gesture
aren't as distinct as we
thought

- There is a **continuum between co-speech gesture and sign language** (MacNeill 2005, Slobin 2008)
 - Gesture may be deeply embedded in sign language (Liddell & Metzger 1998, Liddell 2003)
 - Some gestures resemble depicting signs or depicting signs have gestural elements (Kendon 2004)
- **Pikes**: peaks of physical (including speech) activity (Loehr 2007)
- Gesture can contribute **aspects of meaning** which are not easily verbalised (Rowbotham et al. 2011)
- **Growth point**: common origin for imagery and categorial content (MacNeill 2005)

There is a continuum between co-speech gesture and sign language

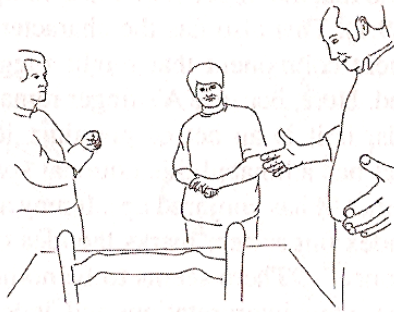
Based on MacNeill (2005: 7-10)

	gesticulation	emblems	sign language
speech?	present	optional	absent
linguistic properties	absent	some	present
conventionalised?	no	partly	fully
semiosis	global	segmented	segmented
	synthetic	synthetic	analytic

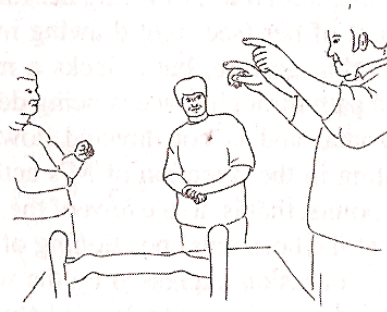
- sign languages contain gesture
- co-speech gesture shares some similarities with sign language

Some gestures resemble depicting signs (or: depicting signs have gestural elements)

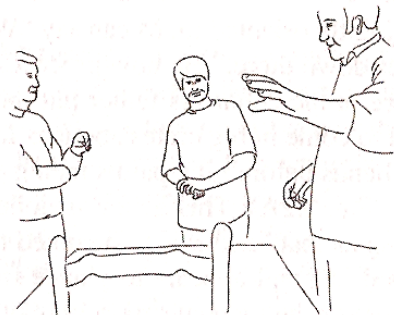
166 *Gesture: Visible Action as Utterance*



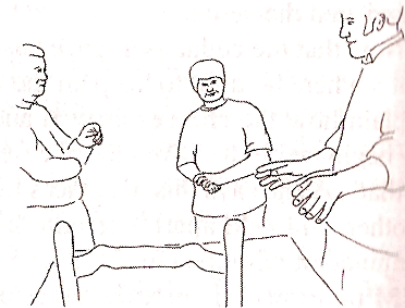
A. "and they used come in crates about as long as that"



B. "and they were shaped like a threepenny bit at the ends"



C. "with slats on"



D. "there used to be two cheeses in each crate"

Gestures specifying size, shape and structure of the cheese crates and how the cheeses were placed in them.

A. **Size-shape-specifier** gesture serving as a **referent for the deictic** pronoun 'that'.

B. **Outline sketching** gesture, **describing the shape** of the ends of the crate.



C. Extended spread fingers moved laterally and horizontally **depict the lateral horizontal arrangement** of multiple long thin objects — the slats on the crate.

D. Spread hands **perform 'object-placement' movements** and thus **indicate the relative position** of the two cheeses packed in the crate.

Kendon (2004: 166)

Talking about pain

Table 4 Examples of semantic feature coding for gesture and speech

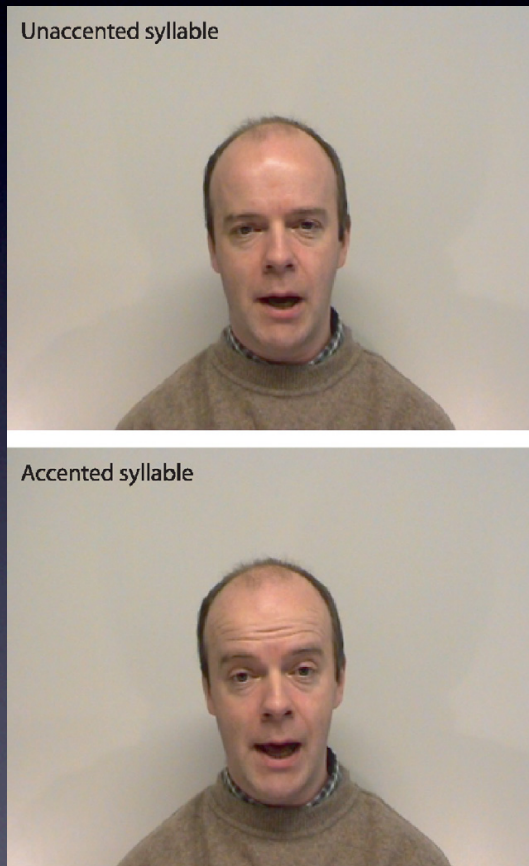
	Gesture ^a	Speech ^b
Location	 <p>Hand moves repeatedly from left to right and back again across the lower stomach</p>	“Sort of <u>lower stomach</u> pains”
Size	 <p>Hands held with palms facing each other and fingers outstretched, first moved towards each other and then out again, to demonstrate the idea of shrinking and swelling</p>	“It feels like my <u>head’s getting smaller</u> and my <u>brain’s getting bigger</u> ”

also: quality, intensity, progression, cause, effects, presence

Rowbotham, S., Holler, J., Lloyd, D., & Wearden, A. (2011). How Do We Communicate About Pain? A Systematic Analysis of the Semantic Contribution of Co-speech Gestures in Pain-focused Conversations. *Journal of Nonverbal Behavior*, 36(1), 1–21.

1.2. Speech perception is enhanced with visual information

(Visual) prosody



- Consensus: auditory signal takes precedence over visual signal, but visual signal improves intelligibility.
- The upper part of the face facilitates identification of prosodic prominence (Swerts & Krahmer 2008) and intelligibility of F0 (Beskow, Granström & House 2006)
- Questions and statements signalled bimodally (Srivasanan & Massaro (2003)
- Head movements improve intelligibility in synthetic speech (Munhall et al 2004)
- Utterance-finality detected better with audio and visual cues, despite individual variation (Barkhuysen, Krahmer & Swerts 2008)

2. The prosody-segment distinction is arbitrary

‘Segmental’ features in conversation

- Aspiration in Tyneside English delimits turns (Local, Kelly & Wells 1986)
- [ʔ, p̚, k̚] etc. mark turn holding in English (Local & Kelly 1986) and Finnish (Ogden 2001)
- Clicks to delimit sequence boundaries (Wright, 2005, 2011a & b)
- = non-lexical functions usually explained primarily in terms of intonation

Articulatory setting + prosodic features

- Repeats in other-initiated self-repair (Curl 2005)
- Turn-projection and talk-projection (Local & Walker 2012)
- Agreement and disagreement (Ogden 2006)
- Repair type affects phonetic design (Plug 2010, 2011)
- Complaints that seek affiliation vs. complaints that close the sequence (Ogden 2010)
- Intensification (Ogden 2012)

Phonetic resources for (dis-)agreeing (Ogden, JPrag 2006)

Strong agreement or Disagreement	Weak agreement (+ disagreement)
<p>Relative to first assessment:</p> <ul style="list-style-type: none"> • wider pitch span • more dynamic contours • tenser articulations • slower tempo <p style="text-align: right;">upgrade</p>	<p>Relative to first assessment:</p> <ul style="list-style-type: none"> • narrower pitch span • less dynamic contours • laxer articulations • faster tempo <p style="text-align: right;">downgrade</p>
<p><i>it's supposed to be really really pretty oh it's supposed to be gorgeous</i></p> <div data-bbox="356 1313 967 1482"> <p>1 → ʔs:ɸəs ɪ̥ βɪ ɹɪ:ɹɪ ɹɪɹɪ pɹeʔɪ 2 → v ɪtsɒstə βɪkʰ g:ʷɔ:ɹɹɪs</p> </div>	<p><i>and it's a lot of hassle it is quite a lot of effort</i></p> <div data-bbox="1283 1313 1792 1482"> <p>1 → ʔãɹɪʔsʔɔl:atʰəvɛʔtʰ 2 → ɪɪzzkwæɔlpfhasɪʔ</p> </div>

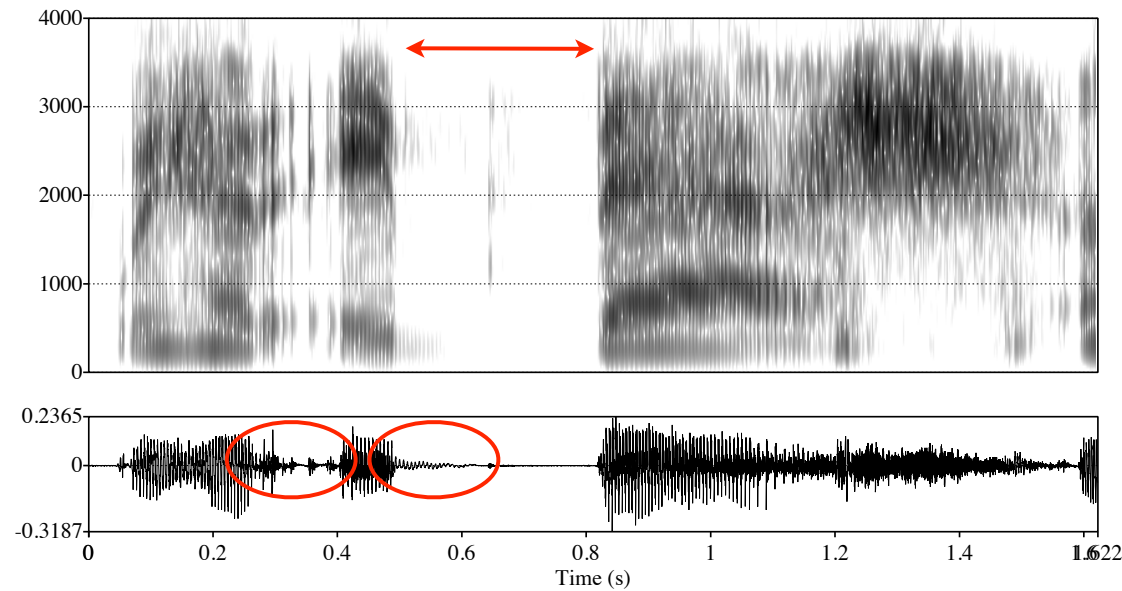
Intensification (Ogden, Phonetica 2012)

7 CH en_4822.924-961

01 A [speaking of which, I had the `rUssians come to the
02 `PARTy on 'thUrSday,
03 B <<laugh> oh 'yEAh?>
04 → A <<all> we had> ?a `B:A:[SH.
05 B [oh my god
06 A you have never seen so much alcohol consumed b[y a] (*) (*)
07 B [re-]
08 r- re[all]y
09 A [(*) (*)]
10 unbelievable
11 B o[:h
12 A [they brought all this gin
13 B he[hehe
14 A [and vodka
15 B really <<laugh> gi[n>
16 A [they got
17 A <<len> `↑SCHNO::Ckere[d=> =they they we had a]
18 B [oh my god]
19 A `↑P:A:R↑ty he[re.
20 B [<<breathy> wo::w::>
21 A dancing arou:nd; spilling stu:ff; still sticky everywhere

CH4822.924-96 I: we had a bash

full form: [eɪ]
closure: 325 ms



glottalisation

voicing + closure: 85 ms

w i h a d

eɪ

b

æ

ʃ

faster

slower

Summary

- **Segments are a convenient fiction**, an epiphenomenon: Abercrombie (1964, 1989), Kelly & Local (1989), Kohler (2011), Laver (1994) + many theories of phonetic production
- ‘Prosodic’ + ‘segmental’ modifications work together
- Actions (like words) have exponents which can be stated in terms of the mutual co-ordination of phonetic parameters in time

3. Sounds that are 'in' speech but not 'of' it:

Clicks and percussives in English conversation

Under review; e-mail for a sneak preview!

Why study clicks?

- In English: non-phonemic, but demonstrably meaningful, sounds ('sound objects', Reber 2012)
- A better understanding of the resources available to speakers to manage talk and mark stance and affect
- Conventional accounts of paralinguistic **form : meaning** (e.g. biological codes, Gussenhoven 2004) are inadequate in accounting for clicks
- A better understanding of where the boundaries of language lie

Affective interpretations of clicks in English

(Wright 2005: 41)

... clicks are said to convey... **disapproval** (Ladefoged 1982: 124; Crystal 1987: 126), **annoyance** (Abercrombie 1967: 31; Ball 1989: 10), **irritation** (Gimson 1970: 34), **exasperation** (Laver 1994: 175), **impatience** (Laver 1994: 175), **regret** (Clark & Yallop 1990: 18), **sympathy** (Gimson 1970: 34) and **encouragement** (Gimson 1970: 34; Abercrombie 1967: 31; Ladefoged 1982: 124; Laver 1994: 177).

‘Broad transcription’ of clicks in English

- [!] Tongue-tip click, generally slow, affricated release down the centre line of the vocal tract. ‘tsk tsk’, ‘tut’. Closure dental or alveolar.
- [||] Tongue-tip click, lateral release. Closure ranges from dental to palatal (retroflex).

Turn-initiation

Pre-turn position. Marks incipient speakership.



Question

ell sum04 cheese

01 P what's on offer at the market then today
02 I !h↓ well we've got lots of cheeses
03 we've got h↓ pancakes
04 very h↓ traditional continental dishes



Click + inbreath + answer

Word search

Mid-turn position. Marks continuing speakership.

Signs of trouble

Salford M & D 1328 secondary school

word search

01 M because there were one or two big houses

02 D yeah

03 M my (0.2) uhm (0.4) ! secondary school

04 the girls' high school. that had been a big house.

Click

Resolution

Preface to 'Resistance'

Marks incipient speakership.

CallHome 4861.60

01 Mom obviously I didn't do a good enough
j[ob of rais[ing you]
02 Deb → [!h↓ [oh s]to:p
03 tha t

Click + inbreath

Spoken part of the turn at a TRP

Clicks as metronomes.

TCU-initial on-beat click in overlap

CK/SW sympathy #63

Rhythmical negative assessment

- | | | | | | | |
|---|---|----------------------|-----------|---|---|----------|
| 1 | A | it's just kinda dull | | | | |
| | | | * | * | * | * |
| 2 | A | God what a miserable | miserable | | | [weekend |
| 3 | B | | | | | [] |
| 4 | B | that's a shame | | | | [[q:::] |

Display of sympathy

Click + response token

(4) CK/SW #63

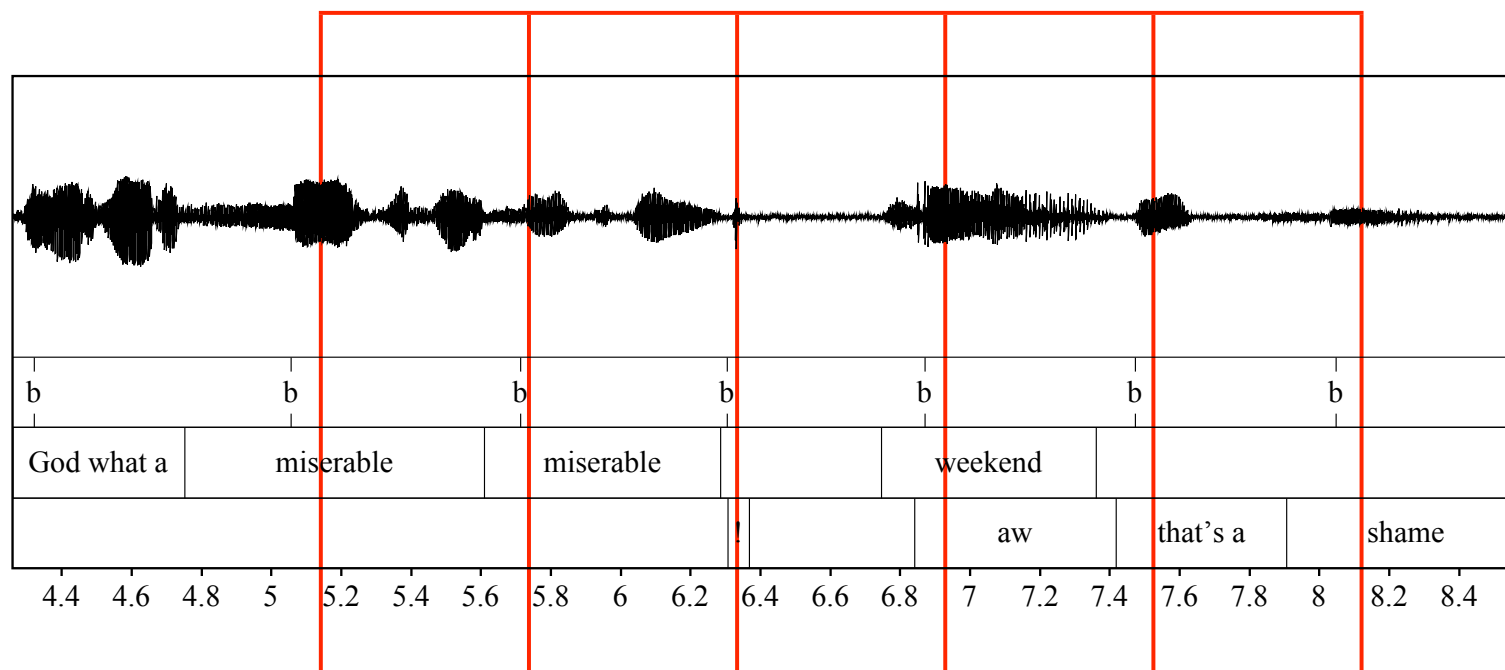
1 A it's just kinda dull

* * * *

2 A God what a miserable miserable [weekend

3 B [|] [[g:::]

4 B that's a shame



<http://cspeech.ucd.ie/~fred/beatExtraction.php>

Clicks + laughter pulses

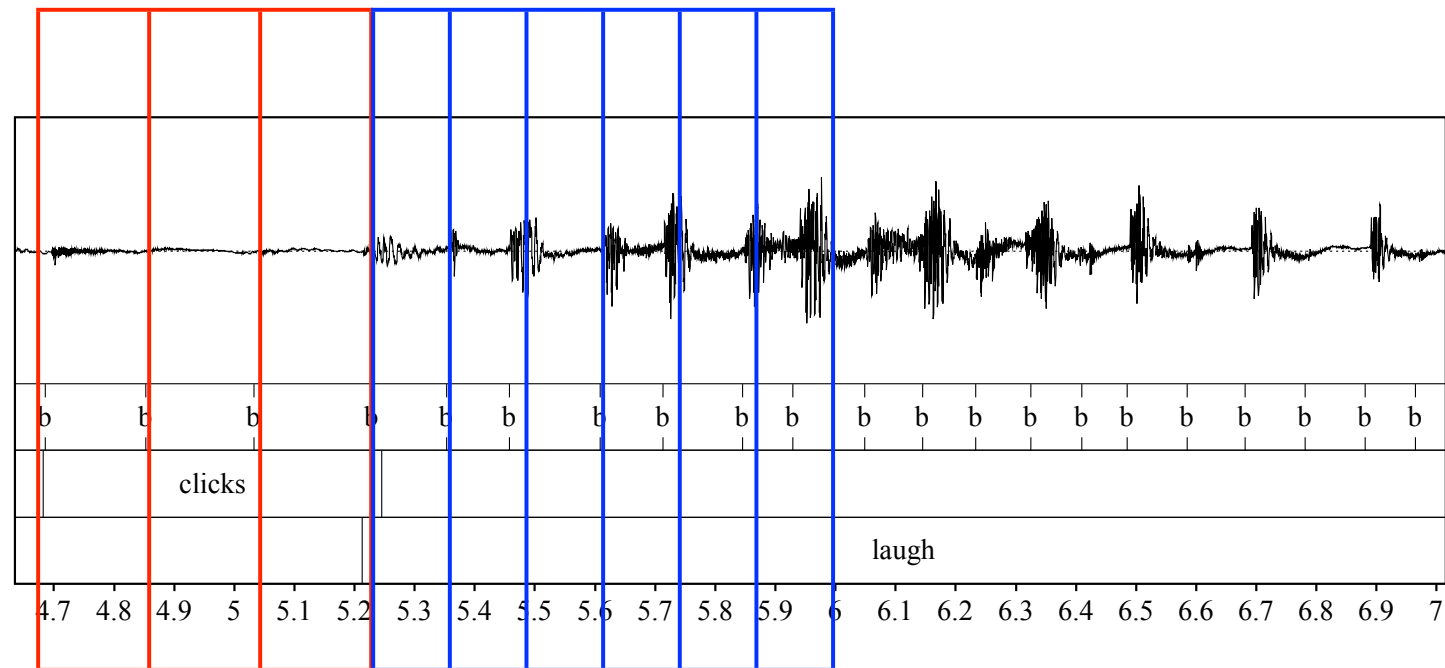
18. Salford A & R lateral click 1654 topless beaches

Anthony and Ray are talking about places they'd like to go. Anthony would like to go to Australia.

01 A I'll just go on the topless beaches
02 R yeah (..) you wish
03 A no I know where they are
04 [|| || || [||]
05 R [<<laugh> * * * * * * * * * * * * * *]
06 A and titty bars
07 R right, anyway
08 A <<laugh>-[----->]
09 R [so where else would <<laugh> you wanna go>]

Salford A & R lateral click 1654 topless beaches

01 A I'll just go on the topless beaches
02 R yeah (..) you wish
03 A no I know where they are
04 [|| || || [||]
05 R [<<laugh> * * * * * * * * * * * * * * * *]
06 A and titty bars
07 R right, anyway
08 A <<laugh>-[----->]
09 R [so where else would <<laugh> you wanna go>]



**Clicks as embodied sound
objects.**

Display of affect

16. Virginia p.3 01:27

23 VIR: Can I please get that dre:ss, please mom? Lemme g[et that-
24 MOM: [Dreh(ss)-?

25 VIR: >You know that [one-<

26 MOM: [OH VIRginia, we('ve) been through this

27 befo[RE, you

28 P??: [hhhh! (

29 VR?:

30 MOM: =just wait a

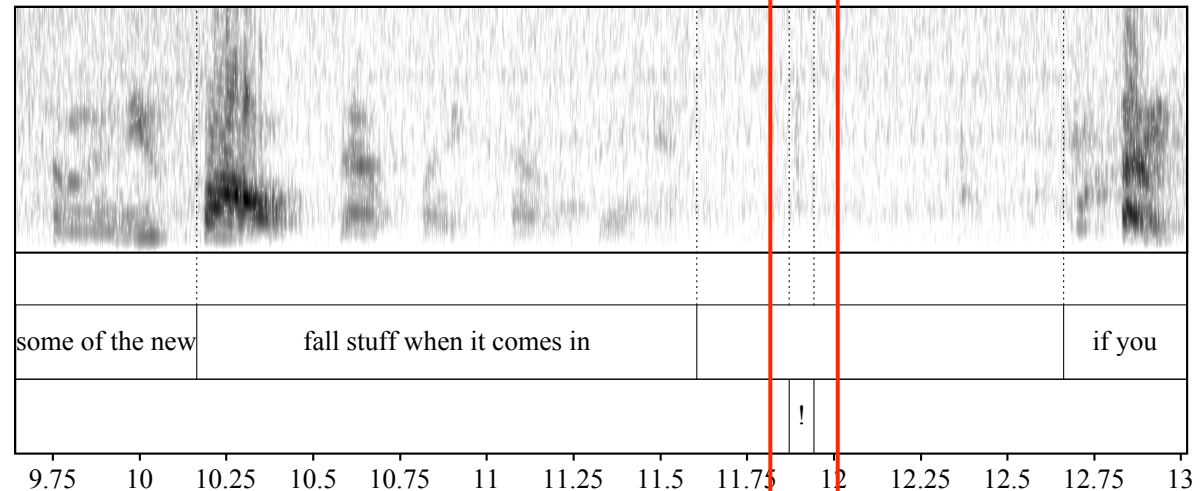
31 in.

32 VIR: → [!]

33 (0.5)

01 PRU: I[t's s o|

02 MOM: [If you s|a





Click + kinetics

16. Virginia p.3 01:27

23 VIR: Can I please get that dre

24 MOM:

25 VIR: >You know that [one-<

26 MOM: [OH VIRgin

27 befo[RE, you've got enoug

28 P??: [hhh! ((laughter?))

29 VR?: [hhh! (("pained" sound))

30 MOM: =just wait an' get- some of the new fa:ll stuff when it comes
31 in.

32 VIR: → [!]

33 (0.5)

01 PRU: I[t's s

02 MOM: [If you



ce,

Head-turn

- Virginia's click is accompanied by a head-turn away from Mom
- It is accompanied by other features which display her exasperation with Mom: nagging, a 'pained' sound, a complaint
- The click is but one part of how Virginia displays her stance towards Mom

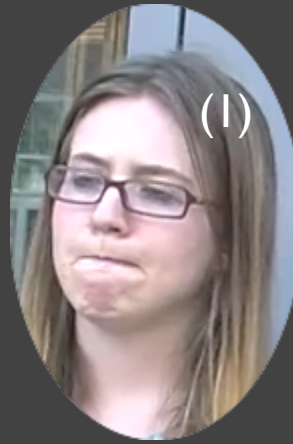
Word search

RCE25 Bench 00.57 library card

01 L and then I went over to the library to-uhm (0.6)
02 → [!] uh see about that-uh
03 I can't remember the name of the card now but to
04 to use other universit[y libraries
05 R [oh a (sconal) card
06 L yeah and I asked the woman at the library and she sort of said
07 yeah you can do that,



Swallowing



RCE25 Bench 00.57 library card

01 L and then I went over to the library to-uhm (1) (2) (3) (0.6)
02 → [!] uh see about that-uh
03 I can't remember the name of the card now but to
04 to use other universit[y] libraries
05 R [oh a (sconal) card
06 L yeah and I asked the woman at the library and she sort of said
07 yeah you can do that,

Swallowing

- The click is the culmination of other physical activity: lip closure, swallow, release. Swallowing is compatible with rarefaction.
- The speaker swallows in a classical word-search environment.
- [swallow] + [click] are ‘in’ speech but not ‘of’ it.
- Visible to us, but R isn’t looking.

Displaying a stance

+ [turn-initial particle:
{oh, ah, ooh,...}]
voice quality; duration;
intonation; pitch span; pitch
range....

+ [loud in-breath]

Marking incipient speakership

[separation of articulators]

[ingressive airflow:
{pulmonic, velaric}]

+ {[ə::], [m::]}

[in-breath]

[swallow]

[word+uh]

velaric ingressive click

Sequence management

‘In’ language but not ‘of’ it...

- Clicks (and percussives) have a regular, but complex, distribution
- Clearly they are not phonemic, but there is an argument that they are linguistic: regular distribution, part of bigger meaning-bearing prosodic constructions (l'arbitraire du signe)

Conclusions

- Sounds have linguistic (especially *lexical*) value. Many ‘paralinguistic’ phenomena display orderly linguistic and sequential patterning.

● **Sound types** = consonant, vowel, suprasegmental (under-theorised on IPA chart). Good evidence from interaction that features of speech work together in bundles; our task is to consider what bundles together, and how it works in time.

Speech is made in the range: larynx to lips/nostrils. Increasing evidence from both lab speech and speech in its most natural setting that visual/gestural information is significant in the accomplishment of action, and in the perception of traditional categories.

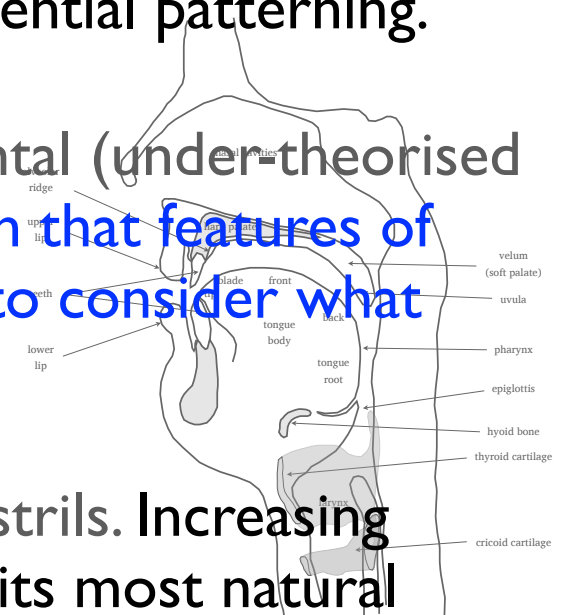
phenomena

	Bilabial	Labiodental	Nasal	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b		t d		ʈ ɖ	c ɟ	k g	q ɢ			ʔ
Nasal	m	ɱ	n		ɳ	ɲ	ŋ	ɴ			
Fricative	f v		s z		ʃ ʒ	x ɣ	χ ʁ	ħ ʕ			h ɦ
Tap or Flap		Ɑ	r		ɽ						
Lateral plosive	ɸ β	f v	ɬ ɮ	s z	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ		h ɦ
Lateral fricative											
Approximant		ʋ					j ɰ				
Lateral approximant			l		ɭ	ʎ	ʝ	ɯ			

[illegible]

OTHER SYMBOLS		bunches together	
V	Voiceless labial-velar fricative	G	Glottal stop
W	Vocalized labial-velar approximant	V	Vocalized alveolar lateral flap
U	Vocalized labial-palatal approximant	fj	Simultaneous labial flap and X
H	Voiceless epiglottal fricative		
C	Vocal epiglottal fricative		
2	Epiglottal plosive		

Speech is made of evidence from setting that vi



Thanks!

University of York Research Priming Fund

For helpful discussions along the way:

Members of the Finnish Centre of Excellence in
Intersubjectivity in Helsinki; Kearsey Cormier, Paul Drew,
John Local, Dan Loehr, Emma Piggott, Jim Scobbie, Rein
Sikveland, Jane Stuart-Smith, Marilyn Vihman, Dom Watt,
Melissa Wright