# Speech Science WiSe 2023

# Exercise 1: Classification of speech sounds Nov 6, 2023

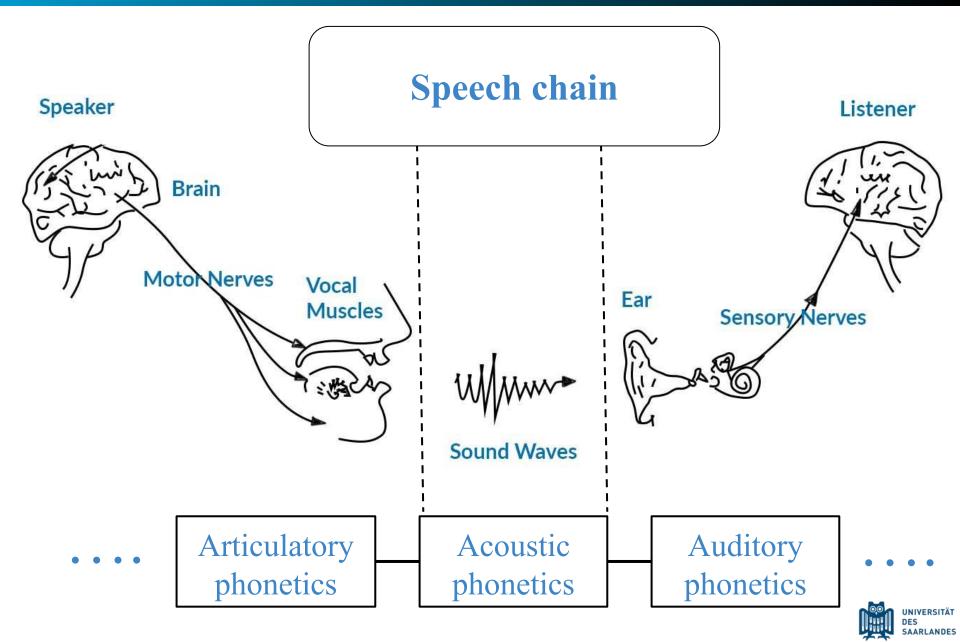


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## Speech science



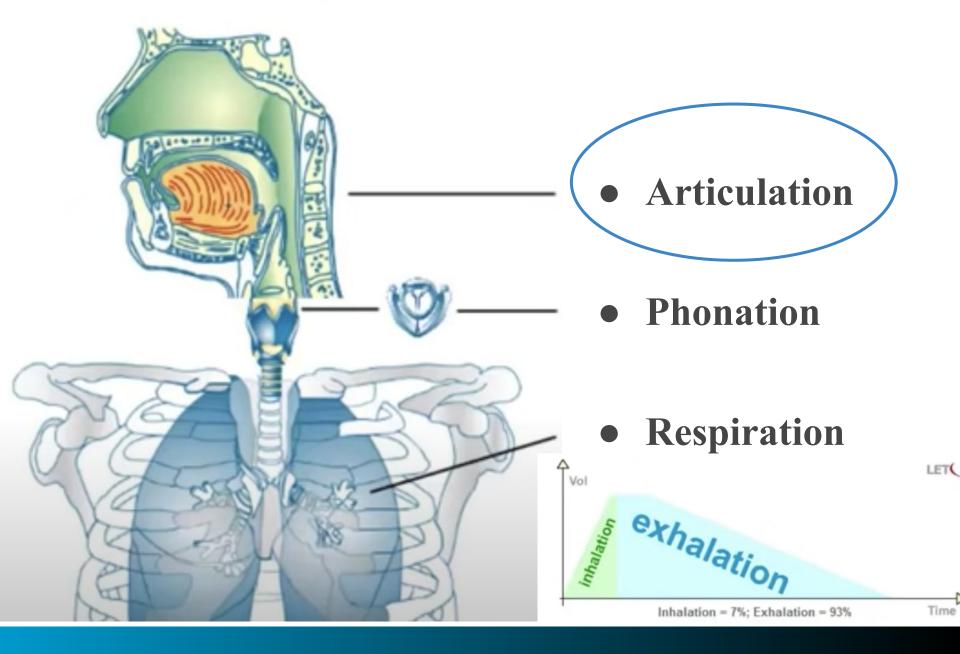
### Exercise 1: How complex is articulation?



Full video: <u>https://www.youtube.com/watch?v=Wh4aEc4yPh0</u> Another video: <u>https://www.youtube.com/watch?v=JF8rlKuSoFM</u>



## Speech production organs



### **Exercise 2:** Speech production organs

### Match the organ with its function:

Diaphragm, Teeth, Lungs, Nasal Cavity, Hard palate, Velum, Larynx,

Jaw, Tongue, Vocal folds

### Articulation

**Phonation** 

Respiration



## Exercise 2: Speech production organs - Answer

### Match the organ with its function:

### Articulation

Teeth, Nasal Cavity, Hard palate, Velum, Jaw, Tongue

### Phonation

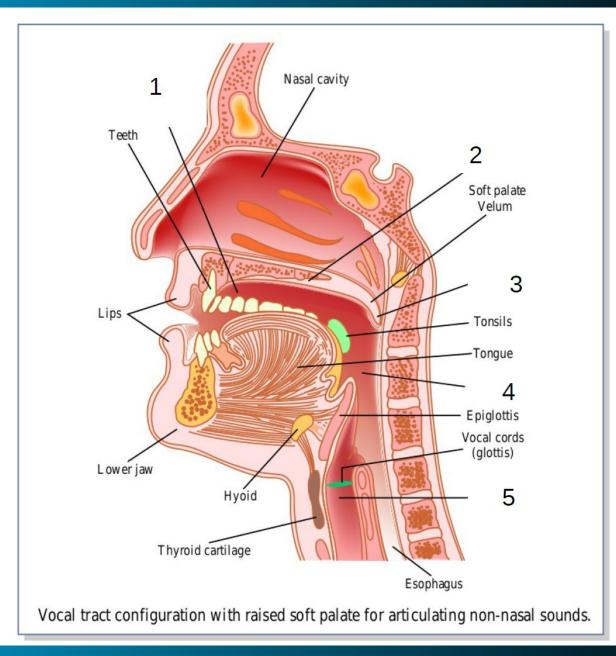
### Larynx

### Respiration

Diaphragm, Lungs, Nasal Cavity

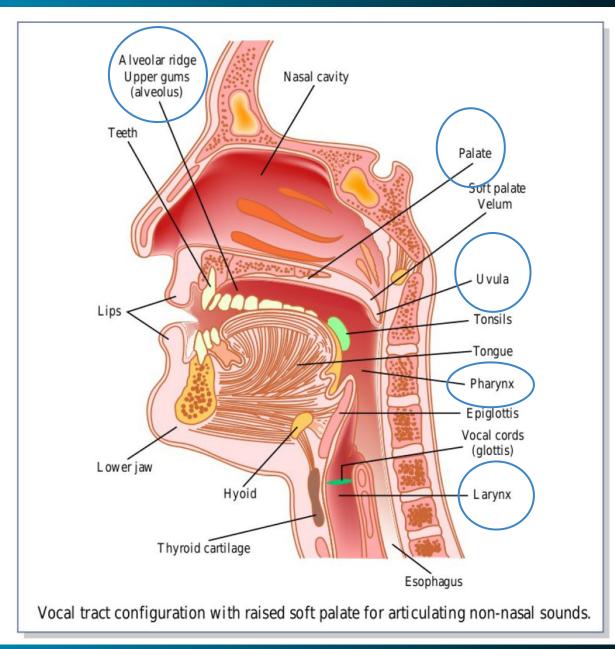


### Exercise 3: Vocal Tract





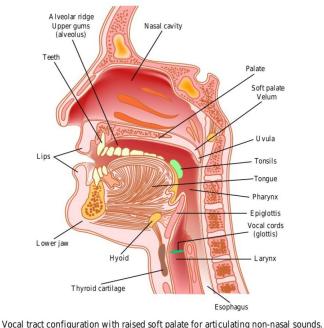
### Exercise 3: Vocal Tract - Answer



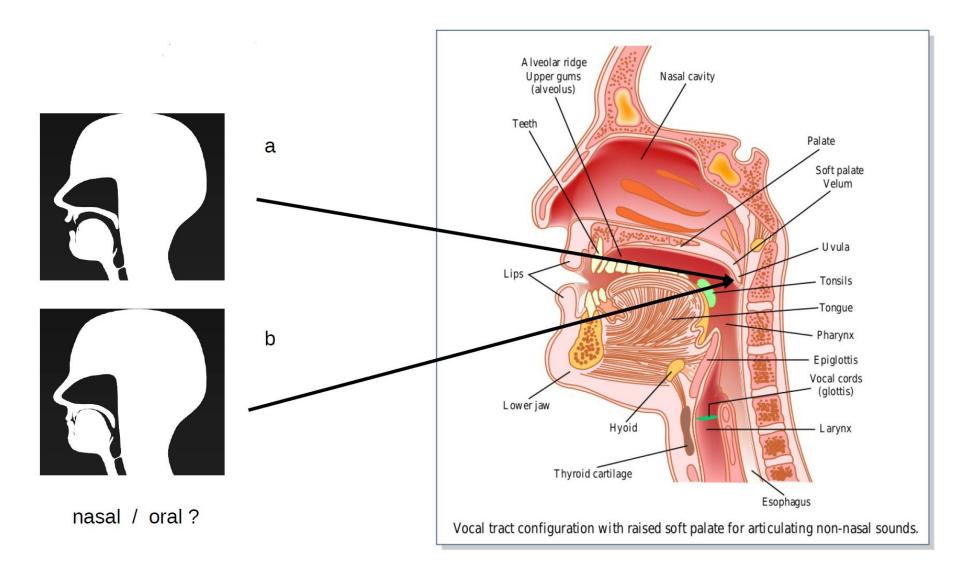


There is a constriction between an active articulator and a passive articulator

- The active articulators are the lower lip and the tongue
- The passive articulators are the upper lip, the upper teeth, the roof of the mouth, and the rear wall

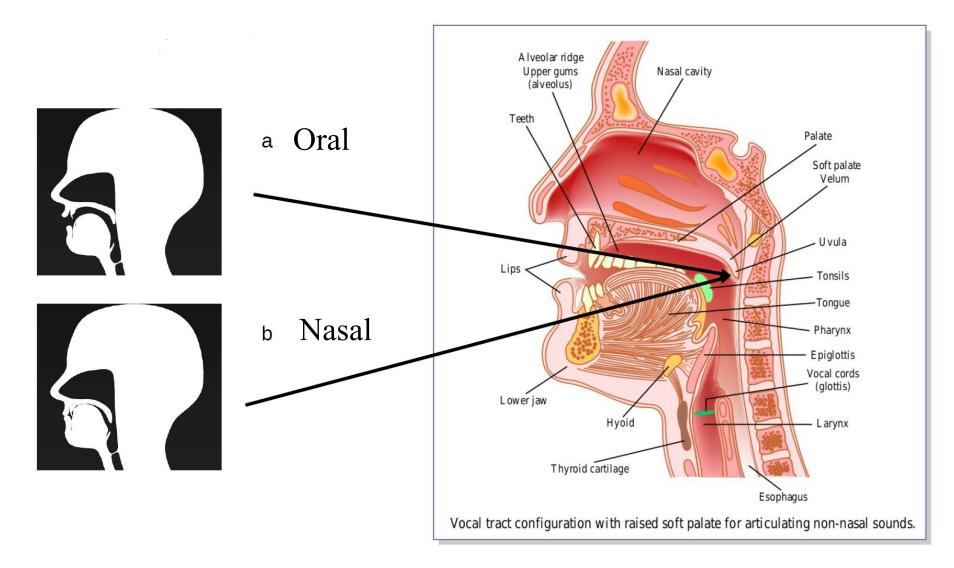


### **Exercise 4: Vocal Tract**





### Exercise 4: Vocal Tract - Answer





## languages in the world



There are over 7000 spoken languages around the world



# **IPA** Chart

### www.internationalphoneticassociation.og

- IPA =International Phonetic Association
- established 1886 in Paris
- Aim: universal classification system for all speech sounds
- Aim: universal phonetic alphabet, to describe all speech sounds of all languages
- most recent revision: alphabet: 2020



## **Classification of speech sounds**

### • Consonants

- $\circ$  Airstream  $\rightarrow$  Pulmonic vs. non-pulmonic
- $\circ \quad \text{Voicing} \rightarrow \text{Binary}$
- $\circ$  Place of articulation  $\rightarrow$  Where
- $\circ \quad \text{Manner of articulation} \rightarrow \text{How}$

### • Vowels

- Tongue movement
- Jaw opening
- Lip rounding



### **IPA:** Consonants

### **CONSONANTS**

	Bila	bial	Labio	dental	Den	tal	Alve	colar	Posta	lveolar	Retr	oflex	Pa	latal	V	elar	Uv	ular	Phary	ngeal	Glo	ottal
Plosive	p	b					t	d			t	d	c	J	k	g	q	G			?	
Nasal		m		ŋ				n		- í		η		ր	1	ŋ		Ν				
Trill		в			1			r		- 1			1		ĵ.			R				
Tap or Flap				v				ſ				t										
Fricative	φ	β	f	v	θ	ð	S	Z	ſ	3	ş	Z	ç	j	X	γ	χ	R	ħ	٢	h	б
Lateral fricative							ł	ķ														
Approximant				v				I				ł		j		щ						
Lateral approximant								1				Ĩ		λ		L						

Symbols to the right in a cell are voiced, to the left are voiceless. Shaded areas denote articulations judged impossible.

Clicks	Voiced implosives	Ejectives
() Bilabial	6 Bilabial	, Examples:
Dental	d Dental/alveolar	p' Bilabial
(Post)alveolar	f Palatal	t' Dental/alveolar
+ Palatoalveolar	g velar	k' Velar
Alveolar lateral	G Uvular	S' Alveolar fricativ

M Voiceless labial-velar fricative

W Voiced labial-velar approximant

H Voiceless epiglottal fricative

Second Second

2 Epiglottal plosive DIACRITICS Voiceless

Voiced

h Aspirated

More rounded

Less rounded

Advanced

Retracted

Syllabic

✤ Rhoticity

Non-syllabic

Centralized

Mid-centralized ê

U Voiced labial-palatal approximant

n d

şţ

Э

Э

u

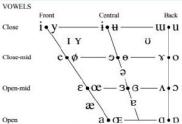
e

ë

n

e

th dh



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

#### SUPRASEGMENTALS

uble articulaties and by two symi	4- 1	Primary stress Secondary stress	,founə <sup>'</sup> tı∫ən
ar if necessary.	<u> </u>	1 Long	ei
		' Half-long	e'
		Extra-short	ĕ
b a	Dental t d	Minor (foot) group	
b a	Apical t d	Major (intonation)	group
ţ₫	Laminal t d	. Syllable break	
t <sup>w</sup> d <sup>w</sup>	Nasalized Õ	Linking (absence of	a break)
t <sup>j</sup> d <sup>j</sup>	<sup>n</sup> <sub>Nasal release</sub> d <sup>n</sup>	TONES AND WOR	D ACCENTS
t <sup>v</sup> d <sup>v</sup>	<sup>1</sup> Lateral release d1	LEVEL	CONTOUR
t <sup>s</sup> d <sup>s</sup>	No audible release d	er ⊓ Extra ě	or A Rising
vngealized	+	∫ é ⊣ <sub>High</sub> ê	V Falling
	1	ē H Mid é	1 High
ę (I -	voiced alveolar fricative)	è ⊣ Low è	1 Low
ę (β, -	voiced bilabial approximant)	è ⊥ <sup>Extra</sup> è	
Root Ç		↓ Downstep	Global rise
Root e			Global fall

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or ar	Retracted Tongue Root	ę	
Some diacritics m	ay be placed above a symbol y	with a descender, e.g. $\mathring{\mathfrak{H}}$	

Advanced Tongue Root C

~ Velarized or pharyngealized

C Z Alveolo-palatal fricatives

I Voiced alveolar lateral flap

Simultaneous and X

Affricates and double articulations

can be represented by two symbols joined by a tie bar if necessary.

Breathy voiced

Creaky voiced

Linguolabial

W Labialized

J Palatalized

Y Velarized

Raised

Lowered

S Pharyngealized

### **IPA:** Seeing speech



Janet Beck: Voiceless bilabial plosive Context: ə\_ə, a\_a, i\_i

### https://www.seeingspeech.ac.uk/ipa-charts/?chart=1



# Pulmonic vs. non-pulmonic consonants

#### CONSONANTS (PULMONIC) @@@ 2020 IPA Dental Alveolar Postalveolar Retroflex Bilabial Labiodental Palatal Velar Uvular Pharyngeal Glottal p b kg 2 t d d C Plosive qG Ŧ Ν Nasal m m n η n ŋ Trill В R r v Tap or Flap ſ r φβ v θðsz sz ç j xγ в р г р џ Fricative f 3 γ Lateral łk fricative υ r щ Approximant Lateral approximant λ L Symbols to the right in a cell are voiced, to the left are voiceless. Shaded areas denote articulations judged impossible.

THE INTERNATIONAL PHONETIC ALPHABET (revised to 2020)

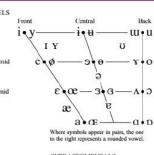
### PULMONIC

### **NON-PULMONIC**

18% of languages [WALS]

airstream

CONSONANTS (NO	ON-PULMONIC)		VOWE	LS
Clicks	Voiced implosives	Ejectives		Front
() Bilabial	6 Bilabial	, Examples:	Close	1.9
Dental	d Dental/alveolar	p' Bilabial		1
! (Post)alveolar	f Palatal	t' Dental/alveola	r Close-m	iid C
🕇 Palatoalveolar	g velar	k' Velar		
Alveolar lateral	$\mathbf{G}$ Uvular	S' Alveolar fricat	tive Open-m	hid
W Voiced labial-vela U Voiced labial-pala		oiced alveolar lateral imultaneous $\int$ and		
H Voiceless epiglotiz	J	imultaneous J and	Χ	
Voiced epiglottal f	Affricate	s and double articulati presented by two sym	4- 1	
2 Epiglottal plosive		a tie bar if necessary		
DIACRITICS				
Voiceless o	n d Breathy ve	oiced <u>b</u> a	Dental	ţ d
Voiced	S t Creaky vo	iced b a	Apical	t d



#### SUPRASEGMENTALS

	Primary stress	,founa tr[an
1	Secondary stress	
:	Long	e:
	Half-long	e'
v	Extra-short	ĕ
1	Minor (foot) group	
	Major (intonation) gro	oup
	Syllable break	.i.ækt

Linking (absence of a break)

			1123	
т	ONES AND LEVEL			TOUR
ế ơ	☐ Extra high	ě or	Л	Rising
é	┨ High	ê	N	Falling
ē	-  міа	é	1	High rising
è	_ Low	è	٢	Low rising
è	⊥ Low	ē	4	Rising- falling
↓ De	ownstep	7 G	lobal	rise

∖ Global fall

↑ Upstep

0	Voiceless	ņ d	. Breathy voiced b a Dental t d	I
~	Voiced	şţ	~ Creaky voiced b a Apical t d	I
h	Aspirated	th dh	Linguolabial t d Laminal t d	I
,	More rounded	ş	W Labialized t W d W ~ Nasalized ~ Õ	
	Less rounded	ç	<sup>j</sup> Palatalized t <sup>j</sup> d <sup>j</sup> <sup>n</sup> Nasal release d	<b>l</b> n
	Advanced	ų	Y Velarized tY dY Lateral release d	1
_	Retracted	e	S Pharyngealized ts ds No audible release d	ľ
••	Centralized	ë	∼ Velarized or pharyngealized ↑	
×	Mid-centralized	ě	Raised C (I - voiced alveolar fricative)	_
	Syllabic	ņ	Lowered $e (\beta - voiced bilabial approximant)$	
~	Non-syllabic	ę	Advanced Tongue Root	
r	Rhoticity	ər ar	Retracted Tongue Root	

Some diacritics may be placed above a symbol with a descender, e.g.  $\mathring{\eta}$ 





## Pulmonic vs. non-pulmonic consonants

# airstream

### NON-PULMONIC

Initiators: Glottis, tongue, \*esophagus

CONSONANT	S (PULMO	ONIC)			19				-	00	© 2020 IPA
	Bilabial	Labiodental	Dental	Alveolar Postal	lveolar	Retroflex	Palatal	Velar	Uvular	Pharyngea	
Plosive	рb			t d		t d	сţ	k g	qG		2
Nasal	m	ոյ		n		η	ր	ŋ	N		
Trill	В		0	r				1	R		
Tap or Flap		v		ſ	1	t	·	1			
Fricative	φβ	f v	θð	s z ſ	3	şz	çj	xγ	χв	ħΥ	h fi
Lateral fricative				4 k	-		,,,				
Approximant		υ		T		ł	i	щ			
Lateral approximant				1		ĺ	À	L			
11	Symbols	to the right in a	a cell are voi	ced, to the left are	voicele	ess. Shaded a	areas denote	articulation	judged imp	ossible.	
CONSONANT Clicks				Electron	-	VOWE	LS Front		Centr	al	Back
	-	oiced implo	sives ,	Ejectives		Close	is	y	-i•1		-m•u
O Bilabial	1.17	Bilabial		Examples:			1	IY		i	5
Dental	ſ	Dental/alveo	lar p'	Bilabial		Close-n	nid	cho.		• e	- * • 0
(Post)alveol	3	Palatal	L.	Dental/slveolar				1		2	1000
+ Palatoalveo	5	Velar	k'	Velar		Open-n	aid.	ε	ee_	-346-	
Alveolar lat	eral G	Uvular	s'	Alveolar fricativ	c	Open-in	lind			P	
OTHER SYM	BOLS								æ	L L	
M Voiceless la		cative C	Z Alveolo	-palatal fricatives		Open		1176	a	E	-a•b
W Voiced labi			*	alveolar lateral fla	0			to the	e right repre	sents a round	ed vowel.
U Voiced labi		C		neous f and X				SU	PRASEGM	ENTALS	
H Voiceless e		tive		J					Primary s	aress	e
§ Voiced epig		Af		double articulation ted by two symbo		ts kp			Secondar	y stress	,founə't
2 Epiglottal p				bar if necessary.		eP		1	Long		e:
									Half-long	L.	e'
DIACRITICS								- ·	Extra-sho	ert	ĕ
Voiceless 0	ņ (	d Bre	athy voiced	b a	Den	vtal	ţd		Minor (fo	oot) group	
✓ Voiced	Ş	t ~ Cre	aky voiced	b a	u Api	cal	ţ₫	ĺĺ	Major (in	tonation) gr	oup
h Aspirated	t <sup>h</sup> (	dh _ Lin	guolabial	ţ d	Lan	ninal	ţd		Syllable I	oreak	.i.ækt
More round	ed Ç be	W Lab	ialized	t <sup>w</sup> d <sup>w</sup>	~ Nas	alized	ẽ	] _	Linking (	absence of a	break)
Less rounde	ç b	j Pala	atalized	t <sup>j</sup> d <sup>j</sup>	n <sub>Nas</sub>	al release	dn		TONES /	ND WORF	ACCENTS
Advanced	ų	Y Vel	arized	t <sup>v</sup> d <sup>v</sup>	I Late	eral release	d1		LEVEL	UVD WORL	CONTOUR
Retracted	e	ς Pha	ryngealized	t <sup>ç</sup> d <sup>ç</sup>	No	audible relea	ise d'	é	or 7 Ext	h ě	r A Rising
" Centralized	ë		arized or pha		ł			é	⊣ на	<sub>sh</sub> ê	V Falling
× Mid-central	~	Rai	30			veolar fricati	ve)	ē		-	1 High rising
Syllabic	n	+	vered	1 1	_	labial approx		è			A Rising
Non-syllabi		-	anced Tong	T AT		and approx		ě	_ low	e	1 falling
<u>^</u>	×	4	776225					1	Downstep		Global rise
∿ Rhoticity	a.	a Ret	racted Tongu	e Root e				1 3	Upstep	7	Global fall

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#### Some diacritics may be placed above a symbol with a descender, e.g. $\mathring{n}$

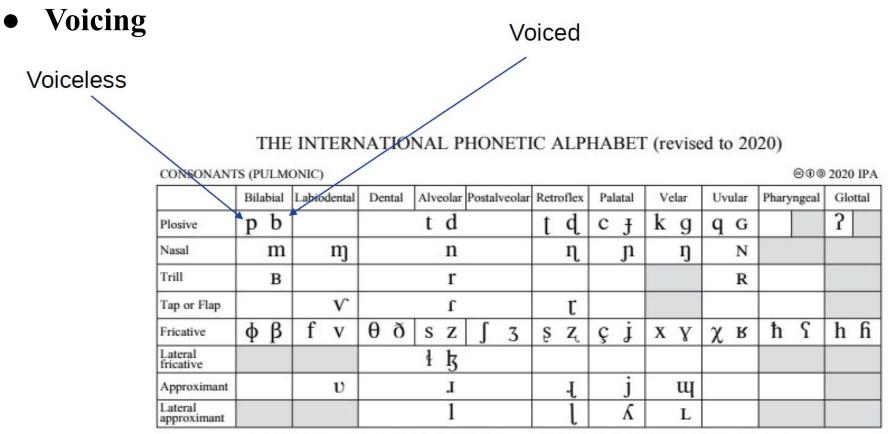
### PULMONIC h fi Initiator: Diaphragm

#### 8.0 C + A a.p e one owel.

1	Primary st	ress	.fc	oonə'tı[ən
1	Secondary	stress		,
:	Long		e	:
:	Half-long		e	•
v	Extra-short	t	ĕ	
1	Minor (for	ot) group		
	Major (into	onation) g	group	
•	Syllable br	eak	it	.ækt
-	Linking (a	bsence of	a brea	k)
	TONES AN	ND WOR	D ACC	CENTS
	LEVEL		CON	TOUR
ő	or 7 Extra high	ěě	α Λ	Rising
é	- High	ê	N	Falling
ē	-  Mid	é	1	High rising
è	_ Low	è	7	Low
è		• ē	4	Rising- falling
t	Downstep	1	Global	
t	Upstep	5	Global	fall



### Classification of speech sounds - Consonants

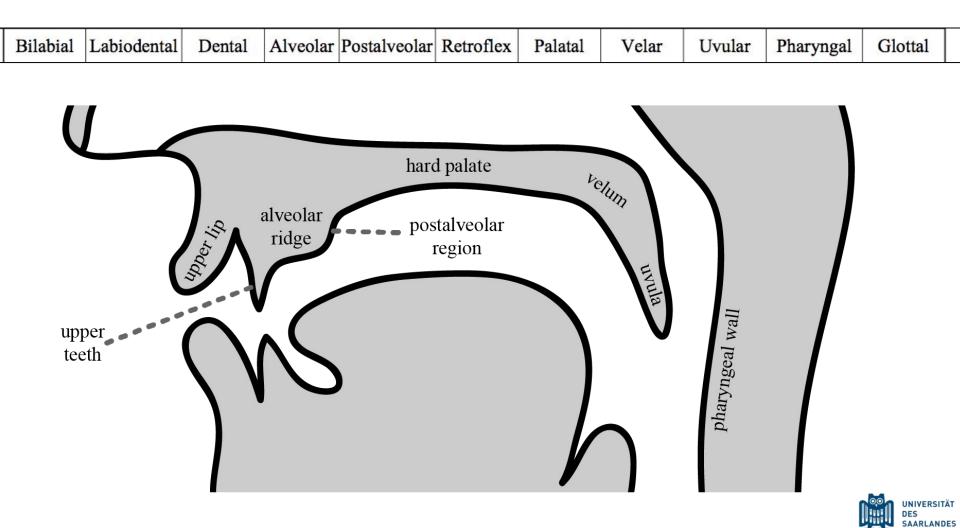


Symbols to the right in a cell are voiced, to the left are voiceless. Shaded areas denote articulations judged impossible.



## Classification of speech sounds - Consonants

### • Place of articulation



### **Classification of speech sounds - Consonants**

### Manner of articulation

#### CONSONANTS (PULMONIC) @ @ @ 2020 IPA Bilabial Labiodental Dental Alveolar Postalveolar Retroflex Palatal Velar Uvular Glottal Pharyngeal 2 b 1 t 2 **3** g Plosive d с Ŧ G q Nasal N m m n η n η Trill в r R v Tap or Flap ſ r S h fi β φ θ ð ħ 4 v 3 J xγ Fricative S Z S Z ç χ R Lateral ķ ŧ fricative Approximant υ r щ Lateral Л L approximant

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Symbols to the right in a cell are voiced, to the left are voiceless. Shaded areas denote articulations judged impossible.



### **IPA:** Consonants Summary

#### CONSONANTS

#### 1. VOICING

#### Cell: left / right

CONSONAN							2		_			_						894	0 2024	IPA
	lida	4	Labio	ócetal	Denta	Alverk	e Postab	colar	Retrof	24	Pal	stal	Ve	lar -	U	wher	Plur	regical	Gle	eul
Pleshe	p	₽		_		t d			1.	U	с	đ	k	g	q	G			?	
Nasal		m		пj		n		_	1	ι		л		ŋ		Ν				
Trill		в				r										R				
Tap or Flap				v		ſ			1	1										
Fricative	φ	β	f	v	θ ð	S Z	1	3	\$ 2	5	ç	j	х	Y	χ	к	ħ	S	h	ĥ
(ateral Incative						1 5				Т										
Approximant				υ		1				ī		j		щ						
Lateral						1				П		ń		L		_				-
	łw	Donal dit ! ∂vet3elveniar dit				Destail	Destallahoolar				and the						40.		- 1	1.2
approximant	Sys	ala da	to the r	-	a call are	roiced, to 0	e lett aver	vincels	rm. Shad	nt an	-		+1++		jalge	d imp			_	
Postjelves	iw.					0° minina 1° menut		Close-mid					c.	0-	-	-9	40	_	- ¥	0
							Open-mid 8					<u> </u>			2					
+ Palatinalizati	dat					¢ velar					2			1			à			
+ Palatoslivo			Vola			K <sup>*</sup> Velar S <sup>*</sup> Abrush			Ope		4			8	10	-	3	a-	- ^	• >
Alveniar la	lenn	d							Ope	• ••	4			8	æ			8- 8	- ^	• >
Alveslar la	neni IDOLS	d	Dua			S <sup>*</sup> Abush	e Bisative		Ope Ope		4				æ	a.	E-	e \	-a	.D
Alveniar la OTHER SYM	neni DOLS abal-v	d	Deale	c	Z Abu	S <sup>*</sup> Abunk	e Bricativo				4			***	æ	a.	E-	G	-0	D
Alveniae la OTHER SYM M Voiceless 3 W Voiced 3d	neni DOLS ubul-v	dia ti	Dual cathe		Z Abu J visi	5 Abunda vio-pulatal (	e Bricative Incatives Internal Thep				4			*1a 1 - 0	æ	a - a	E-	e para	-0	D
Alveniar in OTHER SYM M Volvelen I W Volvel Ide U Volvel Ide	tanal DOLS altal-v at-vela at-gab	diar to reppo	Dvak kather sciinar	с fj	Z Aba J Van Sam	S <sup>*</sup> Abunk storpolated f ed abooster frammen J	e fricative ficatives lateral flag and X				4			*1a 1 - 0	æ	a - a	E-	e para	- Cl , the or d scree	D
Alveniae la OTHER SYM M Voiceless 3 W Voiced 3d	nami DOLS altai-eta ar-eta ar-eta	der för rappe	E Doub kather scitture genititur	- fj	Z Abre J Voir Sam	ric-polatal I ric polatal I rit absorber I Ramone ∫ al deathic ar	e friadire facilities and X facilations or speaked		Opt		4			*1a 1 - 0	at man	a desta a desta a desta a desta a desta a desta a desta a	E-	e pairs roundi	- Cl , the or d scree	D
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Alveniar ia OTHER SYM AN Vokolen I W Vokol Ide U Vokol Ide H Vokol Ide H Vokol Ide S Vokol Ide S Vokol Ide DACRITICS	namal DOCLS advad-se nat-seda original glomal	du li ng	Doub kather scillen	- fj	Z Abu J Voir Sam Diseases a in he reprise and by a t	do-polani l ed abuselar francesar d deable ar unital by two sented by two	e fricative liketives lateral flap and X feodatores re speakok essary.		or IS I					*1a 1 - 0	H 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	a - a abolt of aloged many of many of many of andar	ENT/	e pairs roundi	- a the or d some ,fo e:	D
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### **IPA:** Consonants Summary

#### CONSONANTS

#### 1. VOICING

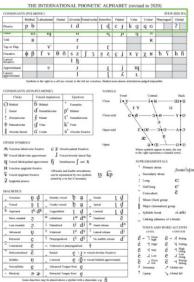
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Paralleses Manhae M. (metanoni) Tanatas (S., 199, Kint, W.S. (1994) and

#### 2. PLACE OF ARTICULATION

#### bilabial



placed above a symbol with a descender, e.g. 13

#### 3. MANNER OF ARTICULATION

#### plosive

CONSONANT								-			2620 119
	28		labiodontal		-	Palatal	Velar	Uvali		ngesl	Glottal
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Trill		в		r				1	R		
Tap or Flap			V'	ſ	r						
Fricative	¢	β	fv	0 ð s z ] 3	ş Z	çj	XΥ	χ1	кþ	S	h fi
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Approximant			υ	1	1	j	щ				
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H Votates of								Prime	ry stress		foon.
\$ vanad and				Distates and double articulations in he represented by two symbols	ts kn	ş		Secon	dary stress		,1008
2 Typyhonal p				ned by a tie har if necessary.	0 1		:	Long			e:
								Half-4	ing		e*
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Mare road , Leta road , Advand , Beracid <sup>10</sup> Contration <sup>21</sup> Mid-central	land	ų ę ē	5 m	terized or pharyngealtreak †	dvode from	PHS 1	ē		High Mil Low Extra	0.00	V rate



### **IPA:** Vowels

#### THE INTERNATIONAL PHONETIC ALPHABET (revised to 2020)

	Bilabia	I I	abio	dental	Der	ntal	Alv	eolar	Postal	veolar	Retr	oflex	Pa	latal	Ve	lar	Uv	ular	Phary	ngeal	Glo	ttal
Plosive	p b						t	d	7		t	d	с	Ŧ	k	g	q	G	1		?	
Nasal	n	1		ŋ				n				η		ր		ŋ		N			1	
Trill	В							r										R			[	
Tap or Flap				v				ſ				t										
Fricative	φβ		f	v	θ	ð	s	Z	ſ	3	ş	z	ç	j	X	γ	χ	R	ħ	٢	h	ĥ
Lateral fricative							ł	ķ														
Approximant				υ				I				ŀ		j		щ						
Lateral approximant								1				1		λ		L						

Symbols to the right in a cell are voiced, to the left are voiceless. Shaded areas denote articulations judged impossible.

Clicks	Voiced implosives	Ejectives
() Bilabial	6 Bilabial	, Examples:
Dental	d Dental/alveolar	p' Bilabial
(Post)alveolar	f Palatal	t' Dental/alveolar
+ Palatoalveolar	g velar	k' Velar
Alveolar lateral	G Uvular	S' Alveolar fricativ

OTHER SYMBOLS

C Z Alveolo-palatal fricatives M Voiceless labial-velar fricative I Voiced alveolar lateral flap W Voiced labial-velar approximant  $\mathbf{U}$  Voiced labial-palatal approximant  $\mathbf{\hat{h}}$  Simultaneous  $\mathbf{\hat{h}}$  and  $\mathbf{X}$ 

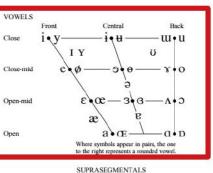
H Voiceless epiglottal fricative § Voiced epiglottal fricative 2 Epiglottal plosive

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

#### DIACRITICS

voiceless	ņ d	Breathy voiced	<u>b</u>	a	Dental t	ď
✓ Voiced	şţ	← Creaky voiced	þ	ą	_ Apical t	đ
h Aspirated	th dh	Linguolabial	ţ	đ	Laminal [	d
More rounded	ş	W Labialized	tw	dw	~ Nasalized	ẽ
Less rounded	ç	j Palatalized	ť	dj	n Nasal release	dn
Advanced	ų	Y Velarized	t¥	dY	Lateral release	dı
Retracted	e	ς Pharyngealized	t <sup>ç</sup>	d٢	No audible release	ď
** Centralized	ë	~ Velarized or phar	yngealia	red	t	
× Mid-centralized	ě	Raised	ę	I -	voiced alveolar fricative)	
Syllabic	ņ	Lowered	ę	β-	voiced bilabial approximar	at)
Non-syllabic	ę	Advanced Tongue	Root	ę		
✤ Rhoticity	or ar	Retracted Tongue	Root	ę	102.0	

Some diacritics may be placed above a symbol with a descender, e.g.  $\mathring{\eta}$ 

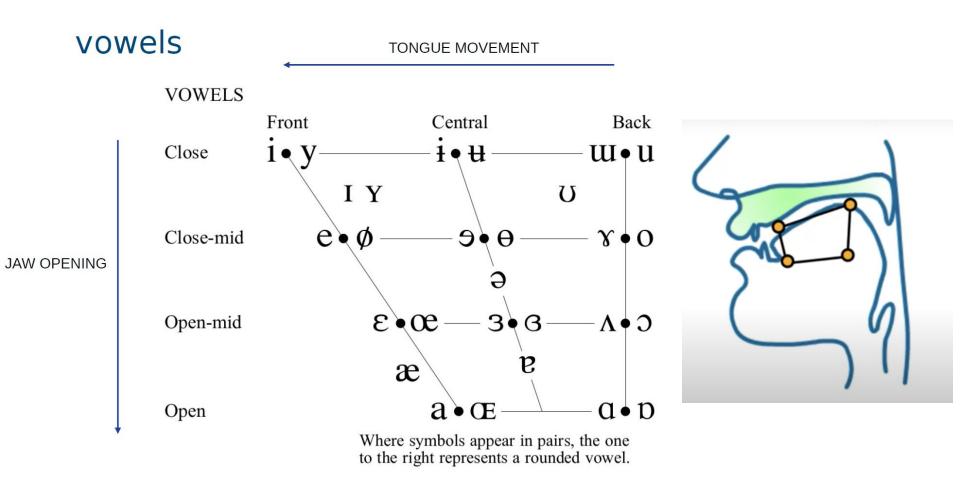


Primary stress	,founə'tı (ən
Secondary stress	"Ioona ulau
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Half-long	e'
Extra-short	ĕ
Minor (foot) group	
Major (intonation)	group
Syllable break	
Linking (absence of	f a break)
TONES AND WOR	ACCENTS
	Secondary stress Long Half-long Extra-short Minor (foot) group Major (intonation) ; Syllable break Linking (absence of TONES AND WOF

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TO	ONES AND	WORD	ACO	CENTS
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è	_ Low	è	٢	Low rising
è	⊥ Low	ē	٦	Rising- falling
↓ De	ownstep	≯ GI	obal	rise
1 UI	ostep	S GI	obal	fall

### **VOWELS**

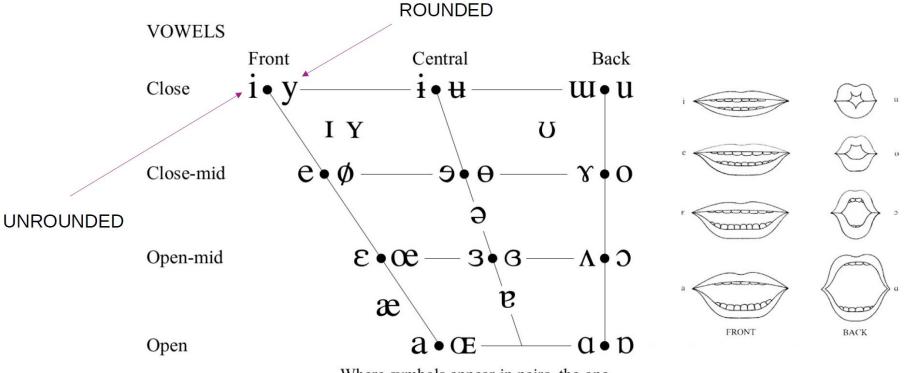






### **IPA:** Vowels





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



#### 1. ROUNDING

### left / right

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#### VOWELS

#### 2. OPEN / CLOSED

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#### 1. ROUNDING

#### [i] unrounded THE INTERNATIONAL PHONETIC ALPHABET (revised to 2020)

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#### 3. FRONT / BACK

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UNIVERSITÄT DES SAARLANDES

## **IPA:** Suprasegmentals

### SUPRASEGMENTALS

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ī	Secondary stress	proofie tijen
I	Long	er
•	Half-long	e'
J	Extra-short	ĕ
Т		

Minor (foot) group

Major (intonation) group

- . Syllable break \_\_\_\_\_\_. Ji.ækt
- Linking (absence of a break)

THE INTERNATIONAL PHONETIC ALPHABET (revised to 2020)

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#### DIACRITICS

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Some diacritics may be placed above a symbol with a descender, e.g.  $\check{I}$ 

#### THE INTERNATIONAL PHONETIC ALPHABET (revised to 2020)

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## **IPA:** Tones and word accents

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### **IPA:** Affricates & double articulation

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

ts kp

Affricate = stop + fricative

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Find the IPA symbol and an example word for the sounds described below. The answers are on the following slide.

01) bilabial nasal

- 02) voiceless labiodental fricative
- 03) glottal plosive
- 04) velar nasal
- 05) voiced alveolar fricative
- 06) voiceless velar plosive

07) voiceless palatal fricative

08) palatal approximant

- 09) voiced postalveolar fricative
- 10) voiced bilabial plosive
- 11) voiced uvular fricative
- 12) voiceless postalveolar fricative

