Segmental Phonetics of German

Roland Schäfer
FU Berlin

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1 Consonant phonemes and their realizations

1.1 Overview

Variants printed grey are not strictly orthoepic, but must be considered the standard realization even for near-orthoepic speakers.[1]

ph.	spec.	realizations	ex.
p	bilab. vcl. pl.	affr. except after fric. in clusters; lateral or nasal release before /l/ resp. nasal, unreleased before other cons.	ˈpᵠapᵠə nɛpᵠ ʃpaːs ˈʔapˈvaə͡tˢən hɔps psiː ʔapⁿˈnøː ʔapˈˈtˢe͡əl
b	bilab. vcd. pl.	sometimes desonorized in onsets, devoiced in codas	ˈboːdən (ˈb̥oːdən) ˈʔaːbɐ loːpᵠ ˈʔapⁿneːmən
m	bilab. nas.		ˈmʊtˢɐ ˈhɛːmə ʃʊam
f	labiodent. vcl. fric.		fla͡o ˈafə ts͡ɔf
ʋ	labiodent. appr.	in clusters with vcl. cons. mostly fric., otherwise appr.	ˈvɐːnɪç alˈkˣoːvə kʋaʁkˣ (kvaːkˣ)
p͡f	lab. vcl. affr.	mostly fric. in onset, affr. elsewhere	ˈp͡fanə (ˈfanə) ˈʔap͡fəl tˢɔp͡f
t	alv. vcl. pl.	like /p/	ˈtˢantˢə ˈmatˢə ʃtatˢ ˈmɪtⁿneːmən ʔɛntˈzɛ͡tsən ʔamtˡlɪç
d	alv. vcd. pl.	like /b/	dʊm (d̥ʊm) ˈʔeːdə bløːtˢ
n	alv. nas.	assimilates to following plosives	niː ˈʔana fɔn ˈʔoŋkˣəl ˈʔampᵠasən
s	alv. vcl. fric.	not in onset	ˈha͡esɐ kloːs
z	alv. vcd. fric.	not in coda	ˈzaːnə ˈha͡ezɐ
t͡s	alv. vcl. affr.		ˈt͡sa͡obɐ ˈat͡sʊŋ mɔt͡s

[1] Words in order of appearance in the table: *Pappe, Nepp, Spaß, abwarten, hopps, Psi, Apnö, Abteil; Boden, aber, Lob, abnehmen; Mutter, Häme, Schwamm; flau, Affe, Zoff; wenig, Alkove, Quark; Pfanne, Apfel, Topf; Tante, Matte, statt, mitnehmen, entsetzen, amtlich, Tinte; dumm, Ede, blöd; nie, Anna, Onkel, von, anpassen; heißer, Kloß; Sahne, heiser; Zauber, Atzung, Motz. schön, Spaß, Asche, Hasch; Garage; Chips, Matsche, Matsch; Dschungel, Loggia; Laden, alle, toll; ja, Anja; Kante, Backe, Rock, Königskind; gut, Oger, log, wenig; Enge, bang; ich, ach; rot, Ehre; Hüfte, Ehe.*

ph.	spec.	realizations	ex.
ʃ	p-alv. vcl. fric.		ʃøːn ʃpaːs ˈʔaʃə haʃ
ʒ	p-alv. vcd. fric.	only in loans	gaˈʁaːʒə
t͡ʃ	p-alv. vcl. affr.	in onset only in loans	t͡ʃɪps (ʃɪps) ˈmat͡ʃə mat͡ʃ
d͡ʒ	p-alv. vcd. affr.	only in loans	ˈd͡ʒʊŋəl ˈlɔd͡ʒa (ˈd̥͡ʒʊŋəl ˈlɔd̥͡ʒa)
l	p-alv. lat. appr.		ˈlaːdən ˈʔalə tˢɔl
j	pal. approx.	mostly fric., in onset sometimes appr., not in coda	jaː (jaː) ˈanja
k	vel. vcl. pl.	like /t/, palatalized before palatal vowels	ˈkˣantˢə ˈbakˣə rɔkˣ ˈkˣøːnɪçsk̟ɪntˢ
g	vel. vcd. pl.	like /d/, but [ç] after /ɪ/ in coda	guːtˢ (ğuːtˢ) ˈʔoːgɐ loːkˣ ʊeːnɪç
ŋ	vel. nas.	not in onset	ˈʔɛŋə baŋ
χ	uv. vcl. fric.	only in coda, [ç] after high vowel, [χ] elsewhere	ʔɪç ʔaχ
ʁ	uv. vcd. fric.	only in onset, often vocalized (cf. 1.5)	ʁoːtˢ ˈʔɐːʁə
h	lar. vcl. fric.	only in onset, orthogr. <h> between vowels often not phonemic	ˈhʏftˢə ˈʔeːə

1.2 Phonemic status of [ʔ] and affricates

True vocalic onset is prohibited, [ʔ] is epenthesised (also in hiatus position: *Verein* [fɐʔa͡en]). Since [ʔ] never has phonemic status, it does not occur in the table. The affricates, however, have marginal phonemic status; they are not composed of plosive plus fricative. Notice that /p͡f/ is not phonetically homorganic ([p] is bilabial, [f] labiodental); since German does not have bilabial fricatives, however, /p͡f/ can be considered phonologically homorganic, hence a true affricate.

1.3 Desonorization

Most voiced plosives are fully voiced intervocalically (though sometimes devoiced after short vowels, even before long vowel), generally tend to be desonorized in onsets, and are fully unvoiced in codas (*Auslautverhärtung*), thus merging with the corresponding voiceless phonemes in that position. Many (Southern) dialects only have one series of stops (desonorized voiced), e.g., /b̥ d̥ g̊/.

1.4 Plosive coarticulation and release type

Voiceless plosives are usually slightly affricated (not aspirated), but /k/ is palatalized before high vowels (/e, i/) instead, which we indicate by a subscript diacritic k̟. All these coarticulations are weak (e.g., the palatalization effect is much weaker than in Russian, where palatalization marks a phonological contrast).

Before nasals (even crossing syllable boundaries), plosives are usually nasally released, the release being homorganic with the plosive: *Pappnase* [ˈpᵠapⁿnaːzə], *mitnehmen* [ˈmɪtⁿneːmən]. Before /l/, lateral release of dentals is observed with most speakers: *wissenschaftlich* [ˈvɪsənʃaftˡlɪç]. Coarticulation is blocked in the case of nasally released and unreleased stops, plus after /ʃ/ within clusters: *spitz* [ʃpɪt͡s], *Stuhl* [ʃtuːl].

1.5 Realizations of /r/

/r/ is never realized as the trill [r], except in dialects spoken in the South and the far North (German-Frisian dialects). In the orthoepic standard, we get the following distribution:

phon	environ.	ex.
[ʁ]	onset, deson. after vcl. pl.	*rot* [ʁoːtˢ], *krass* [kʁ̥as], *braun* [bʁa͡on].
[ɯ̯]	in coda after /a/	*Karneval* [ˈkˣaɯ̯nəval], *wunderbar* [ˈvʊndɐbaːɯ̯]
[ə̆]	for some speaker instead of [ɯ̯]	*Art* [aˑətˢ]
[ɐ]	from the sequence /ər/ in codas of *schwa* ([ə]) syllables	*weniger* [ˈveːnɪgɐ], *Verein* [fɐʔa͡ɐn]
[ɐ]	in coda after long vowels except /a/, vowel is half-long, phonetic diphthong results	*der* [de͡ɐ], *Chor* [kˣo͡ɐ], *Tür* [tˢy͡ɐ], *Bier* [bi͡ɐ], *Stör* [ʃtø͡ɐ]
[ɐ̆]	after short vowels except *schwa*, diphthong results	*Korn* [kˣɔ͡ɐ̆n], *gern* [gɛ͡ɐ̆n], *Kirche* [ˈkʲɪ͡ɐ̆çə]

1.6 Syllabic consonants in *schwa* syllables

In final *schwa* syllables with sonorant /n m l/ in coda position, *schwa* is usually elided, and the sonorant becomes syllabic: *sagen* [ˈsaːgⁿn̩], *haben* [ˈhaːbⁿm̩]. Such realizations are near-orthoepic and far more frequent than the full schwa articulations.

2 Vowel phonemes

2.1 Vowel diagram

	front		central		back
high/closed	iː yː	ɪ ʏ		ʊ	uː
mid	eː øː ɛ ɛː œ		ə		oː ɔ
low/open		aː a	ɐ		

2.2 Diphthongs

There are only three phonological diphthongs in German: /a͡ɪ/, /a͡ʊ/, and /ɔ͡ɪ/. The second element is partially assimilated to the first in height (it is lowered to half-open): [a͡ɛ] *Kaiser* [ˈkˣa͡ɛzɐ], [a͡o] *laufen* [ˈla͡ofən], *heute* [ˈhɔ͡ʏtˢə] (cf. arrows in the diagram). Phonetic diphthongs occur with *r* vocalizations (cf. 1.5)

2.3 Duration

Length[2] is systematically distinguished phonologically. On the phonetic side, phonological length covaries with quality; short vowels are more open and mostly slightly centralized: [iː ɪ], [yː ʏ], [uː ʊ], etc. /a/ is an exception ([aː a]). The *e*-sounds show more complicated oppositions: /eː/ *wenig* [ˈveːniç] has no short counterpart. There are two melodically identical open *e*-sounds: /ɛː/ *Käse* [ˈkˣɛːzə] and /ɛ/ *endlich* [ˈʔɛntˡlɪç]. Additionally, there is *schwa* [ə], which can be analyzed as the unaccented phonological variant of /ɛ/, *benutzen* [bəˈnʊt͡sən]. Its extra-short variant occurs in the *r*-vocalizations (cf. 1.5).
Duration also varies with accent. We find occurrences of unaccented vowels which are melodically like long vowels but significantly shorter in duration: *Politik* [pᵠoˑlɪˈtˢɪkˣ].

[2] In phonetics, one speaks of plain physical duration, not of length. In German, length and duration usually covary. We will return to the problem in the second, 'experimental' half of the course.