German

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1. Language description

The German language is part of the West Germanic branch of the Germanic language family. It is not only the language of administration in Germany, but in Austria and parts of Switzerland (Wiese 1996), Lichtenstein, Luxembourg, Eastern Belgium and South Tyrol as well. Minority populations all over the world also speak German. In total, the language has around 100 million speakers (Microsoft Encarta Enzyklopädie, 2000). The language of administration – the official language – is described as "Standarddeutch". This is also the official language in kindergartens and in schools (Fox-Boyer 2016).

Germany has around 16 known dialects that are grouped into 3 categories. These categories are often described as "Oberdeutsch", "Mitteldeutsch" and "Niederdeutsch" (GenWiki, 2011). But due to the various definitions of the word dialect it is not possible to determine the number of dialects exactly. The use of dialect has strongly decreased in Germany in recent years (Fox-Boyer). This is the reason dialect is not taken into account.

Consonant system

Table 1

Consonant system of the German language according to Fox-Boyer (2016, p. 30)

	Coronal						Dorsal			
	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosives	p b			t d			k g[1]			ʔ
Nasals	m			n			ŋ			
Trills				r						
Fricatives		f v		s z	ʃ	ç[1]	x[1]	ʁ[1]		h
Affricates	pf			ʦ						
Liquids				l						
semivowels						j				

Black: is also part of Dutch green: German only

[1]this is an allophone

The German language has a set of rules that determine when a certain sound may be used. These 'phonotactical' rules have been described by Grassegger (2006), Kannengieser (2012) and Fox-Boyer (2016).

- Word-initial syllables never begin with /ŋ/, /s/, /x/ or /ç/, with the exception of loan words
- /ŋ/ is never in a morpheme's the initial position
- Final-obstruent devoicing → No voiced plosives or fricatives are allowed at the end of a syllable
- In "Standarddeutsch", /r/ is always [ʁ] except after long vowels or in the final position of a word. In this situation, it becomes an [ɐ] → "vokalischer Ersatzlaut" (Fox-Boyer, 2016, p.39) An example of this is the world Bär (see score form).
- /ŋ/ in the word-final position becomes [ŋ] or [ŋk]
- /x/ only after back vowels and /ç/ only after front vowels

Syllable structure

The most common syllable structure in German consists only of an initial consonant (C) and a vowel (V). This creates the CV syllable structure such as in the words 'ma-ma' and 'pa-pa' (mother and father). Apart from this simple structure, the German language also has more complex structures (Grassegger, 2006). The maximum standard structure consists of CCVCC (Lleo & Prinz, 1996). Exceptions to this structure result in the following syllable structures also being allowed (Fox, 2016):

Nominals: [C 0-3] – V – [C 0-3]

Verbs: [C 0-3] – V – [C 0-5]

The syllable structure and consonant clusters in German also have phonotactical rules.

- Plosives and fricatives (apart from /v/) are not allowed in the second position of the cluster
- Nasals, vibrants and laterals are not allowed in the first position
- In the final position of a syllable, clusters often use the inverse order of the initial clusters
- In the final position of syllables, vibrants or laterals and nasals are also allowed
- In the initial position of words with clusters, there are usually two-consonant clusters
- Affricates (except /tʃ/) + a consonant as well as combinations with an initial /ʃ/ or /s/ are permitted
- After /ʃp/ in a syllable-initial position, only liquids are permitted
- After /ʃt/ only vibrants are permitted
- 3 consonants in the initial position only through /ʃ/ and a voiced plosive

Stress

German has various stress patterns (Grassegger, 2006). The most common pattern is trochaic (stressed and unstressed) (Weinrich & Zehner, 2008). The same applies to Dutch.

2. Consonant acquisition order

Table 2

Age of acquisition of German consonants according to Fox-Boyer (2016)

Age	75% criterion	90 % criterion
1:6 to 1;11	m b p d t n	m p d
2:0 to 2;5	v h s z	b n
2;6 to 2;11	f l j ŋ x ʁg k pf	v f l t ŋx h k s z
3;0 to 3;5	ç ʦ	j ʁg pf
	bl gl kl fl bʁ fʁ dʁ	fʁ kl
3;6 to 3;11	ʃ	ʦ
	gʁ kʁ kv ʃm ʃn ʃʁ ʃp ʃv	bl bʁ fl gl gʁ
4;0 to 4;5	kn ʃl ʃt ʃpʁ ʃtʁ	ç
		dʁ tʁ kʁ kn kv ʃl ʃm ʃn ʃʁ ʃp ʃv ʃt
4;6 to 4;11		ʃ ʃpʁ ʃtʁ

For consonant clusters, the word-initial cluster counts

According to Kannengieser (2012), children from the age of 2;5 produce clusters in the final position. Clusters in initial positions at this age are often still simplified and will not be fully acquired until their fourth year.

Children both with and without language disorders have far less trouble acquiring the final clusters (Roonath and Bernhardt 217) than they do initial clusters. That is why only the initial clusters have been tested in Speakboo, and only those clusters that should be acquired by the fourth year.

3. Common phonological processes

Fox-Boyer (2016) distinguishes between physiological processes and pathological processes. The physiological processes are part of the normal language development. In contrast to these are the pathological processes that do not occur in normal language acquisition. Pathological processes must always be treated, while physiological processes only require treatment when they have not been resolved after a certain age.

Table 3

Simplification processes among normally developing children according to Fox-Boyer (2016)

Process	Examples	Number in study*	Treatment from
Fronting	ku: → tu: ʁiŋ → ʁin	37	3;5 years
Fronting sibilants	ʃa:f → sa:f		4;5- 5;0 years
Cluster reduction	tʁɛpə → tɛpə	23	3;0 years
Voicing	pɪnnə → bɪnnə	17	3;0 years
Affricate reduction	ʦi:gə → si:g	17	4;0 years
Devoicing	tax → tax	10	4;5 – 5;0 years
Addition	hu:n → hu:nt	9	3;5 – 4;0 years

**Observed in the study of 54 monolingual German children (see paragraph 5)*

Table 4

Pathological processes according to Fox-Boyer (2016)

Process	Examples	Number in study*	Treat always
Backing	tɔpf → kɔpf	17	√
Final consonant deletion	ʃa:f → ʃa:	20	√
Metathesis	baʊm → maʊb	3	√
Epenthesis	ʦigə → ʦi:glə	1	√
Cluster alteration	blu:mə → sʁu:mə	0	√

**Observed in the study of 54 monolingual German children (see paragraph 5)*

4. Permitted lexical variations

Word	IPA					Permitted variation
3.Huhn (hen)	h	u:	n			ha:n (rooster)
4.Bär (bear)	b	ɛ:	ɐ:			bʁaʊnbɛ:ɐ: (brown bear) aisbɛ:ɐ: (polar bear)
5.Herz (heart)	h	ɛ	ɐ	ts		hɛɐtsçən (little heart)
6.Dach (roof)	d	a	x			daxʦi:gəl (roof tile) daxbo:dn (attic)
7.Nase (nose)	n	a:	z	ə		na:zənlɔx (nostril)
8.Jacke (coat)	j	a	k	ə		ʁegənjakə (rain coat)
14.Topf (pan)	t	ɔ	pf			kɔxtɔpf (cooking pan)
16.Ziege (goat)	ts	i:	g	ə		ʦi:gənbɔk (buck)
17.Blume (flower)	b	l	u:	m	ə	zɔnənblu:mə (sunflower)
19.Kleid (dress)	k	l	aɪ	t		klaɪtçən (little dress)
20.Glas (glass)	g	l	a:	s		vɑsegla:s (water glass)
25.Fisch (fish)	f	ɪ	ʃ			gɔltfɪʃ (goldfish)
33.Schrank (cabinet)	ʃ	ʁ	a	ŋ	k	klaɪdeʃʁɑŋk (clothes cabinet) ky:lʃʁɑŋk (refrigerator)
35.Schwanz (tail)	ʃ	v	a	n	ts	kɑʦənʃvanʦ(cat tail) hʊndəʃvanʦ (dog tail)

Figure 1. permitted variation

5. Performance of normally developing German toddlers

In November 2017, 54 monolingual German children between 36 and 50 months of age were tested using the German version of Speakaboo (Heins, Krabbe & Krause, 2018). The children attended a regular (German) kindergarten and insofar as the teachers were able to assess, all experienced normal (language) development. The average age of the children was 42;6 months.

The test was taken by the developers of the German version. The children had to match a picture they were shown to the same picture on a field of 3x3 images and then name the word. If the child did not spontaneously name it, it was first given some help (description or a sentence to complete). If the word was still not mentioned, it would be prompted. If the child then did not repeat the word, the researchers moved on to the next word.

All the children's utterances have been scored on the German score form. The German-language text contains a total of 36 words and 94 consonants, with the consonants in a cluster being counted separately. If a child only realises the /b/ in the /bʁ/ cluster, only the /b/ will count toward the correct consonants.
Because not all words could be assessed (not all pictures were named), not all children had all 94 consonants assessed. This was taken into account when calculating the scores. Table 5 shows the averages from the entire group. Among younger children, between ages 3;0 and 3;5, the PCC may be somewhat lower due to the consonant /ʃ/ and the clusters containing /ʃ/ mostly being acquired from age 3;6 onward.

Table 5
Average scores of normally developing monolingual German children

Age	42;6 months
Number of consonants incorrect	11.3
Number of words not spontaneously named	4.2
Number of consonants assessed	93.5
Number of consonants correct	82.2 (93.5-11.3)
Percentage of Consonants Correct (PCC)	87.8 (82.2/93.5*100)

Table 6
Items that had to be repeated most often

item	**frequency**
30.Dreieck (triangle)	22
18.Fliege (fly)	20
16.Ziege (goat)	18
29.Gras (grass)	16
10.Wippe (seesaw)	16
21.Teppich (rug)	14
6.Dach (roof)	14
4.Bär (bear)	12

Example of an average score

Case German: Boy, 41 months

Number of mistakes:	11
Words repeated:	2
Unable to assess:	0
Assessed:	94
Correct:	82
PCC:	87

X: klank is verkeerd gerealiseerd *Ø: klank is weggelaten* *NG: woord is nagezegd*

Woord	IPA								NG	Proces/Opmerkingen
1.Kuh (koe)	k	u:								
2.Baum (boom)	b	aʊ	m							
3.Huhn (kip)	h	u:	n							
4.Bär (beer)	b	ɛ:	ɐ:							
5.Herz (hart)	h	ɛ	ɐ	ts						
6.Dach (dak)	d	a	x							Haus Chuis)
7.Nase (neus)	n	a:	z	ə						
8.Jacke (jas)	j	a	k	ə						
9.Sonne (zon)	z	ɔ	n	ə						
10.Wippe (wip)	v	ɪ	p	ə						
11.Messer (mes)	m	ɛ	s	ɐ						
12.Apfel (appel)	a	pf	ə	l						
13.Löwe (leeuw)	l	ø:	v	ə						
14.Topf (pan)	t	ɔ	pf							
15.Fahrrad (fiets)	f	a:	ʁ	a:	t					
16.Ziege (geit)	~~ts~~	i:	g	ə						ts → s
17.Blume (bloem)	b	l	u:	m	ə					
18.Fliege (vlieg)	f	l	i:	g	ə					Biene (bij)
19.Kleid (jurk)	k	l	aɪ	t						
20.Glas	g	l	a:	s					V	Becher (beker)
21.Teppich (kleed)	t	ɛ	p	ɪ	~~ʁ~~				V	ç → s platte
22.Papagei	p	a	p	a:	g	aɪ				
23.Frau (vrouw)	f	ʁ	aʊ							
24.Brot (brood)	b	ʁ	o:	t						
25.Fisch (vis)	f	ɪ	~~ʃ~~							ʃ → s
26.Treppe (trap)	t	ʁ	ɛ	p	ə					
27.Spinne (spin)	ʃ	p	ɪ	n	ə					
28.Krone (kroon)	k	ʁ	o:	n	ə					
29.Gras	g	r	a:	s						
30.Dreieck (driehoek)	d	ʁ	aɪ	ɛ	k					
31.Schaf (schaap)	~~ʃ~~	a:	f							ʃ → s
32.Schnecke (slak)	~~ʃ~~	n	ɛ	k	ə					ʃ → ç
33.Schrank (kast)	~~ʃ~~	ʁ	a	ŋ	k					ʃ → s
34.Schmetterling(vlinder)	~~ʃ~~	m	ɛ	t	ɐ	l	ɪ	ŋ		ʃ → s
35.Schwanz (staart)	~~ʃ~~	v	a	n	~~ts~~					ʃ → ç ts → st
36.Hubschrauber (helikopter)	~~h~~	ʊ	~~p~~	ʃ	ʁ	aʊ	b	ɐ		h → s~~t~~ p → b
Totaal aantal consonanten fout										**A.** 12
Totaal aantal consonanten geproduceerd 94 – aantal consonanten van niet geproduceerde woorden										**B.** 94
(B-A) / B * 100										**PCC** 87

Speakaboo – Scoreformulier Duits 3.4

Figure 2. Scan of a completed score form for German

6. Sources

Ammon, U. (1995). *Die deutsche Sprache in Deutschland, Österreich und der Schweiz.* Berlin: Walter de Gruyter.

Fox-Boyer, A.V. (2016). *Kindliche Aussprachestörungen.* (7.Auflage). Idstein: Schulz-Kirchner.

GenWiki (2011). *Dialekte.* Aufgerufen am 24.10.2017 von http://wiki-de.genealogy.net/Dialekte

Grassegger, H. (2006). *Phonetik Phonologie.* (3. Auflage). Idstein: Schulz-Kirchner.

Kannengieser, S. (2012). *Sprachentwicklungsstörungen – Grundlagen, Diagnostik und Therapie.* (2. Auflage). München: Elsevier.

Lleo, C., & Prinz, M. (1996). Consonant clusters in child phonology and the directionality of syllable structure assignment. *Journal of Child Language,* 23, 31-56.

Microsoft Encarta Enzyklopädie (2000). *Deutsche Sprache.* Download am 17.10.2017 von http://www.cvd-gs.de/uploads/media/AP_Deutsche_Sprache_Encarta.pdf

Romonath, R. & Bernhardt, B.M. (2017). Erwerb prosodischer Wortstrukturen bei Vorschulkindern mit und ohne phonologische Störungen. *Forschung Sprache - E-Journal für Sprachheilpädagogik, Sprachtherapie und Sprachförderung.* 5(1), 91-107

Weinrich, M., & Zehner, H. (2008). *Phonetische und phonologische Störungen bei Kindern.* (3. Auflage). Heidelberg: Springer Medizin.

Wiese, R. (1996). *The Phonology of German.* Oxford: Clarendon.