

## Introducing Phonology

This accessible textbook provides a clear and practical introduction to phonology, the study of sound patterns in language. Designed for undergraduates with only a basic knowledge of linguistics, it teaches in a step-by-step fashion the logical techniques of phonological analysis and the fundamental theories that underpin it. Through over sixty graded exercises, students are encouraged to make their own analyses of phonological patterns and processes, based on extensive data and problem sets from a wide variety of languages. *Introducing Phonology* equips students with the essential analytical skills needed for further study in the field, such as how to think critically and discover generalizations about data, how to formulate hypotheses, and how to test them. Providing a solid foundation in both the theory and practice of phonology, it is set to become the leading text for any introductory course, and will be invaluable to all students beginning to study the discipline.

DAVID ODDEN is Professor in the Department of Linguistics, Ohio State University, having previously held positions at Yale University, the University of Tromsø and the University of Durham. He is the author of *The Phonology and Morphology of Kimatuumbi* (1996), and has contributed to many journals such as *Phonology*, *Language*, *Linguistic Inquiry*, *Linguistic Analysis*, *Journal of African Languages and Linguistics* and *Studies in African Linguistics*, of which he is the editor.

Cambridge University Press  
0521826691 - Introducing Phonology  
David Odden  
Frontmatter  
[More information](#)

---

### Cambridge Introductions to Language and Linguistics

This new textbook series provides students and their teachers with accessible introductions to the major subjects encountered within the study of language and linguistics. Assuming no prior knowledge of the subject, each book is written and designed for ease of use in the classroom or seminar, and is ideal for adoption on a modular course as the core recommended textbook. Each book offers the ideal introductory materials for each subject, presenting students with an overview of the main topics encountered in their course, and features a glossary of useful terms, chapter previews and summaries, suggestions for further reading, and helpful exercises. Each book is accompanied by a supporting website.

#### Books published in the series

*Introducing Phonology* David Odden

*Introducing Speech and Language Processing* John Coleman

#### Forthcoming:

*Introducing Phonetic Science* John Maidment and Michael Ashby

*Introducing Sociolinguistics* Miriam Meyerhoff

*Introducing Morphology* Maggie Tallerman and S. J. Hannahs

*Introducing Historical Linguistics* Brian Joseph

*Introducing Second Language Acquisition* Muriel Saville-Troike

*Introducing Language* Bert Vaux

# Introducing Phonology

DAVID ODDEN  
*Department of Linguistics  
Ohio State University*



# Contents

<i>About this book</i>	<i>page</i> ix
<i>Acknowledgments</i>	x
<i>A note on languages</i>	xi
<i>List of abbreviations</i>	xiv
<b>1</b> What is phonology?	1
1.1 Concerns of phonology	2
1.2 Phonetics – what is physical sound?	4
1.3 The symbolic representation of speech	14
<i>Summary</i>	17
<i>Exercises</i>	17
<i>Suggestions for further reading</i>	17
<b>2</b> Phonetic transcriptions	19
2.1 Vowels: their symbols and properties	20
2.2 Consonants: their symbols and properties	26
2.3 IPA symbols	34
2.4 Illustrations with English transcription	36
<i>Summary</i>	37
<i>Exercises</i>	40
<i>Suggestions for further reading</i>	41
<b>3</b> Allophonic relations	43
3.1 English consonantal allophones	44
3.2 Allophony in other languages	49
<i>Summary</i>	61
<i>Exercises</i>	61
<i>Suggestions for further reading</i>	65
<b>4</b> Underlying representations	67
4.1 The importance of correct underlying forms	68
4.2 Refining the concept of underlying form	71
4.3 Finding the underlying form	73
4.4 Practice at problem solving	80
4.5 Underlying forms and sentence-level phonology	82
4.6 Underlying forms and multiple columns in the paradigm	85
<i>Summary</i>	94
<i>Exercises</i>	94
<i>Suggestions for further reading</i>	98

<b>5</b>	<b>Interacting processes</b>	99
5.1	Separating the effects of different rules	100
5.2	Different effects of rule ordering	112
	<i>Summary</i>	121
	<i>Exercises</i>	122
	<i>Suggestions for further reading</i>	127
<b>6</b>	<b>Feature theory</b>	129
6.1	Scientific questions about speech sounds	130
6.2	Distinctive feature theory	135
6.3	Features and classes of segments	150
6.4	Possible phonemes and rules – an answer	154
6.5	The formulation of phonological rules	157
6.6	Changing the theory	160
	<i>Summary</i>	166
	<i>Exercises</i>	167
	<i>Suggestions for further reading</i>	168
<b>7</b>	<b>Doing an analysis</b>	169
7.1	Yawelmani	170
7.2	Hehe	177
7.3	Icelandic	185
7.4	Modern Hebrew	191
7.5	Japanese	197
	<i>Summary</i>	207
	<i>Exercises</i>	207
	<i>Suggestions for further reading</i>	223
<b>8</b>	<b>Phonological typology and naturalness</b>	225
8.1	Inventories	226
8.2	Segmental processes	228
8.3	Prosodically based processes	244
8.4	Why do things happen?	250
	<i>Summary</i>	255
	<i>Suggestions for further reading</i>	255
<b>9</b>	<b>Abstractness and psychological reality</b>	257
9.1	Why limit abstractness?	258
9.2	Independent evidence: historical restructuring	273
9.3	Well-motivated abstractness	277
9.4	Grammar-external evidence for abstractness	287
9.5	How abstract is phonology?	297
	<i>Exercises</i>	298
	<i>Suggestions for further reading</i>	300

---

<b>10</b>	<b>Nonlinear representations</b>	301
	10.1 The autosegmental theory of tone: the beginnings of change	302
	10.2 Extension to the segmental domain	321
	<i>Summary</i>	329
	<i>Exercises</i>	329
	<i>Suggestions for further reading</i>	331
	<i>Glossary</i>	333
	<i>References</i>	339
	<i>Index of languages</i>	345
	<i>General Index</i>	347

# About this book

This is an introductory textbook on phonological analysis, and does not assume any prior exposure to phonological concepts. The core of the book is intended to be used in a first course in phonology, and the chapters which focus specifically on analysis can easily be covered during a ten-week quarter. Insofar as it is a textbook in phonology, it is not a textbook in phonetics (though it does include the minimum coverage of phonetics required to do basic phonology), and if used in a combined phonetics and phonology course, a supplement to cover more details of acoustics, anatomy and articulation should be sought: Ladefoged 2001a would be an appropriate phonetics companion in such a course.

The main emphasis of this book is developing the foundational skills needed to analyze phonological data, especially systems of phonological alternations. For this reason, there is sig-

nificantly less emphasis on presenting the various theoretical positions which phonologists have taken over the years. Theory cannot be entirely avoided, indeed it is impossible to state generalizations about a particular language without a theory which gives you a basis for postulating general rules. The very question of what the raw data are must be interpreted in the context of a theory, thus analysis needs theory. Equally, theories are formal models which impose structure on data – theories are theories *about* data – so theories need data, hence analysis. The theoretical issues that are discussed herein are chosen because they represent issues which have come up many times in phonology, because they are fundamental issues, and especially because they allow exploration of the deeper philosophical issues involved in theory construction and testing.



# Acknowledgments

A number of colleagues have read and commented on versions of this book. I would like to thank Lee Bickmore, Patrik Bye, Chet Creider, Lisa Dobrin, Kathleen Currie Hall, Sharon Hargus, Tsan Huang, Beth Hume, Keith Johnson, Ellen Kaisse, Susannah Levi, Marcelino Liphola, Mary Paster, Charles Reiss, Richard Wright, and especially Mary Bradshaw for their valuable comments on earlier drafts. Andrew Winnard and Juliet Davis-Berry have also provided valuable comments during the stage of final revisions, and Heather Curtis provided assistance in the production of the drawings. I would also like to thank students at the University of Western Ontario, University of Washington, University of Tromsø, Ohio State University, Kyungpook National University, Concordia University, and the 2003 LSA Summer Institute at MSU, for serving as a sounding board for various parts of this book.

Data from my own field notes provide the basis for a number of the examples, and I would like to thank my many language consultants for the data which they have provided me, including Tamwakat Gofwen (Angas), Bassey Irele (Efik), Edward Amo (Gã), John Mtenge and the late Margaret Fivawo (Hehe), Beatrice Mulala (Kamba), Oben Ako (Kenyang), Deo Tungaraza

(Kerewe), Emmanuel Manday (Kimatumbi), Matthew Kirui (Kipsigis), Habi (Kotoko), Patrick Bamwine (Nkore), David Mndolwa (Shambaa), Kokerai Rugara (Shona), Udin Saud (Sundanese) and Nawang Nornang (Tibetan).

I would like to thank a number of professional colleagues for providing or otherwise helping me with data used in this book, including Charles Marfo (Akan), Grover Hudson (Amharic), Bert Vaux (Armenian), David Payne (Axininca Campa), Hamza Al-Mozainy (Bedouin Hijazi Arabic), Nasiombe Mutonyi (Bukusu), Anders Holmberg (Finnish), Georgios Tserdanelis (Modern Greek), Lou Hohulin (Keley-i), Younghee Chung, Noju Kim, and Misun Seo (Korean), Chacha Nyaigotti Chacha (Kuria), Marcelino Liphola (Makonde), Karin Michelson (Mohawk), Ove Lorentz (Norwegian), Berit Anne Bals (Saami), Nadya Vinokurova (Sakha/Yakut), and Wayles Browne, Svetlana Godjevac and Andrea Sims (Serbo-Croatian), all of whom are blameless for any misuse I have made of their languages and data.

Finally, I would like to acknowledge my debt to authors of various source books, in particular Whitley 1978, Halle and Clements 1983, and especially Kenstowicz and Kisseberth 1979.

# A note on languages

The languages which provided data for this book are listed below. The name of the language is given, followed by the genetic affiliation and location of the language, finally the source of the data ("FN" indicates that the data come from my own field notes). Genetic affiliation typically gives the lowest level of the language tree which is likely to be widely known, so Bantu languages will be cited as "Bantu," and Tiv will be cited as "Benue-Congo," even though "Bantu" is a part of Benue-Congo and "Tiv" is a specific language in the Tivoid group of the Southern languages in Bantoid. Locations will generally list one country but sometimes more; since language boundaries rarely respect national boundaries, it is to be understood that the listed country (or countries) is the primary location where the language is spoken, especially the particular dialect used; or this may be the country the language historically originates from (the Yiddish-speaking population of the US appears to be larger than that of any one country in Eastern Europe, due to recent population movements).

- Akan [Volta-Congo; Ghana]: Dolphyne 1988; Charles Marfo p.c.  
 Amharic [Semitic; Ethiopia]: Whitley 1978; Grover Hudson p.c.  
 Angas [Chadic; Nigeria]: FN.  
 Arabela [Zaparoan; Peru]: Rich 1963.  
 Aramaic (Azerbaijani) [Semitic; Azerbaijan]: Hoberman 1988.  
 Araucanian [Araucanian; Argentina, Chile]: Echeverría and Contreras 1965; Hayes 1995.  
 Armenian [Indo-European; Armenia, Iran, Turkey]: Vaux 1998 and p.c.  
 Axininca Campa [Arawakan; Peru]: Payne 1981 and p.c.  
 Bedouin Hijazi Arabic [Semitic; Saudi Arabia]: Al-Mozainy 1981 and p.c.  
 Bukusu [Bantu; Kenya]: Nasiombe Mutonyi p.c.  
 Catalan [Romance; Spain]: Lleo 1970, Kenstowicz and Kisseberth 1979; Wheeler 1979; Hualde 1992.  
 Chamorro [Austronesian; Guam]. Topping 1968; Topping and Dungca 1973; Kenstowicz and Kisseberth 1979; Chung 1983.  
 Chukchi [Chukotko-Kamchatkan; Russia]: Krauss 1981.  
 Digo [Bantu; Kenya and Tanzania]: Kisseberth 1984.  
 Efik [Benue-Congo; Nigeria]: FN.  
 Eggon [Benue-Congo; Nigeria]: Ladefoged and Maddieson 1996.  
 Evenki [Tungusic; Russia]: Konstantinova 1964; Nedjalkov 1997; Bulatova and Grenoble 1999.  
 Ewe (Anlo) [Volta-Congo; Benin]: Clements 1978.  
 Farsi [Indo-European; Iran]: Obolensky, Panah and Nouri 1963; Cowan and Rakušan 1998.  
 Finnish. [Uralic; Finland, Russia]: Whitney 1956; Lehtinen 1963; Anders Holmberg p.c.  
 Fula [West Atlantic; West Africa]: Paradis 1992.  
 Gã [Volta-Congo; Ghana]: FN in collaboration with Mary Paster.  
 Luganda [Bantu; Uganda]: Cole 1967; Snoxall 1967.  
 Gen [Kwa; Togo]: FN.  
 Greek [Indo-European; Greece]: Georgios Tserdanelis p.c.  
 Hebrew [Semitic; Israel]: Kenstowicz and Kisseberth 1979.  
 Hehe [Bantu; Tanzania]: FN in collaboration with Mary Odden.  
 Holoholo [Bantu; Congo]: Coupez 1955.  
 Hungarian [Uralic; Hungary]: Vago 1980, Kenesei, Vago and Fenyvesi 1998, 2000.  
 Icelandic [Germanic; Iceland]: Einarsson 1945; Jónsson 1966; Oresnik 1985.  
 Japanese [Japanese; Japan]: Martin 1975.  
 Jita [Bantu; Tanzania]: Downing 1996.  
 Kamba [Bantu; Kenya]: FN in collaboration with Ruth Roberts-Kohno.

- Karok [Hokan; USA]: Bright 1957, Kenstowicz and Kisseberth 1979.
- Keley-i [Austronesian; Philippines]: Kenstowicz and Kisseberth 1979; Lou Hohulin p.c.
- Kenyang [Bantu; Cameroun]: FN.
- Kera [Chadic; Chad]: Ebert 1975; Kenstowicz and Kisseberth 1979.
- Kerewe [Bantu; Tanzania]: FN.
- Kikuyu [Bantu; Kenya]: Clements 1984.
- Kimatuumbi [Bantu; Tanzania]: FN.
- Kipsigis [Nilotic; Kenya]: FN.
- Klamath [Penutian; USA]: Barker 1963, 1964.
- Koasati [Muskogean; Louisiana]: Kimball 1991.
- Kolami [Dravidian; India]: Emeneau 1961.
- Korean [Korean; Korea]: Martin 1992; Younghee Chung, Noju Kim and Misun Seo p.c.
- Koromfe [Gur; Bourkina Fasso]: Rennison 1997.
- Kotoko [Chadic; Cameroun]: FN.
- Krachi [Kwa; Ghana]: Snider 1990.
- Kuria [Bantu; Kenya]: FN.
- Lamba [Bantu; Zambia]: Doke 1938, Kenstowicz and Kisseberth 1979.
- Lardil [Pama-Nyungan; Australia]: Klokeid 1976.
- Latin [Indo-European; Italy]: Allen and Greenough 1983; Hale and Buck 1966.
- Lithuanian [Indo-European; Lithuania]: Dambriunas et al. 1966; Ambrasas 1997; Mathiassen 1996.
- Lomongo [Bantu; Congo]: Hulstaert 1961.
- Lulubo [Nilo-Saharan; Sudan]: Andersen 1987.
- Makonde [Bantu; Mozambique]: Marcelino Liphola p.c.
- Maltese [Semitic; Malta]: Aquilina 1965; Borg and Azzopardi-Alexandre 1997; Brame 1972; Hume 1996.
- Manipuri [Sino-Tibetan; India, Myanmar, Bangladesh]: Bhat and Ningomba 1997.
- Maranungku [Australian; Australia]: Tryon 1970; Hayes 1995.
- Margyi [Chadic; Nigeria]: Hoffmann 1963.
- Mende [Mande; Liberia, Sierra Leone]: Leben 1978.
- Mixtec [Mixtecan; Mexico]: Pike 1948; Goldsmith 1990.
- Mohawk [Hokan; USA]: Postal 1968; Beatty 1974; Michelson 1988 and p.c.
- Mongolian [Altaic; Mongolia]: Hangin 1968.
- Nkore [Bantu; Uganda]: FN in collaboration with Robert Poletto.
- Norwegian [Germanic; Norway]: Ove Lorentz p.c.
- Osage [Siouan; Oklahoma]: Gleason 1955.
- Ossetic [Indo-European; Georgia, Russia]: Abaev 1964; Whitley 1978.
- Palauan [Austronesian; Palau]: Josephs 1975; Flora 1974.
- Polish [Slavic; Poland]: Kenstowicz and Kisseberth 1979.
- Quechua (Cuzco) [Quechua; Peru]: Bills et al. 1969; Cusihuamán 1976, 1978.
- Saami [Uralic; Sápmi (Norway, Sweden, Finland, Russia)]: FN in collaboration with Curt Rice and Berit Anne Bals.
- Sakha (Yakhut) [Altaic; Russia]: Krueger 1962; Nadezhda Vinokurova p.c.
- Samoan [Austronesian; Samoa]: Milner 1966.
- Serbo-Croatian [Slavic; Yugoslavia] Kenstowicz and Kisseberth 1979; Wayles Browne, Svetlana Godjevac and Andrea Sims p.c.
- Setswana [Bantu; Botswana]: Cole 1955, Snyman, Shole and Le Roux 1990.
- Shambaa [Bantu; Tanzania]: FN.
- Shona [Bantu; Zimbabwe]: FN.
- Swati [Bantu; Swaziland]: FN.
- Slave [Athapaskan; Canada]: Rice 1989.
- Slovak [Slavic; Slovakia]: Kenstowicz 1972; Rubach 1993.
- Somali [Cushitic; Somalia]: Andrzejewski 1964; Kenstowicz 1994; Saeed 1993, 1999
- Sundanese [Austronesian; Indonesia]: FN.
- Syrian Arabic [Semitic; Syria]: Cowell 1964.
- Tera [Chadic; Nigeria]: Newman.
- Thai [Daic; Thailand]: Halle and Clements 1983.
- Tibetan [Sino-Tibetan; Tibet]: FN.
- Tiv [Benue-Congo; Nigeria]: Arnott 1964; Goldsmith 1976.
- Tohono 'O'odham (Papago) [Uto-Aztecan; USA]: Saxton 1963, Saxton and Saxton 1969, Whitley 1978.
- Tonkawa [Coahuiltecan; USA]: Hoijer 1933.
- Turkish [Altaic; Turkey] Lees 1961, Foster 1969, Halle and Clements 1983.
- Ukrainian (Sadžava, Standard) [Slavic; Ukraine]: Carlton 1971; Kenstowicz and Kisseberth 1979; Press and Pugh 1994 (Standard); Popova 1972 (Sadžava).

- Vata [Kru; Côte d'Ivoire]: Kaye 1982.  
Votic [Uralic; Russia]: Ariste 1968.  
Warao [Warao; Venezuela] Osborn 1966, Hayes 1995.  
Weri [Goilalan; New Guinea]: Boxwell and Boxwell 1966; Hayes 1995.  
Wintu [Penutian; USA]: Pitkin 1984.
- Woleaian [Austronesia; Micronesia]: Sohn 1975.  
Yawelmani [Penutian; USA]: Newman 1944; Kenstowicz and Kisseberth 1979.  
Yekhee (Etsako) [Edoid; Nigeria]: Elimelech 1978.  
Yiddish [Germanic; Eastern Europe]: Neil Jacobs p.c.  
Yoruba [Kwa; Nigeria]: Akinlabi 1984.

# Abbreviations

abl	ablative	masc	masculine
acc	accusative	ms(c)	millisecond
ant	anterior	nas	nasal
ATR	advanced tongue root	neut	neuter
bk	back	nom	nominative
c.g.	constricted glottis	obj	object
cl	class	pl	plural
cons	consonantal	poss	possessive
cont	continuant	pres	present
cor	coronal	rd	round
dat	dative	sg, sing	singular
dB	decibel	s.g.	spread glottis
del.rel	delayed release	son	sonorant
dim	diminutive	sp	species
distr	distributed	strid	strident
e.o.	each other	syl	syllabic
fem	feminine	tns	tense
gen	genitive	tr	transitive
hi	high	vcd	voiced
Hz	Hertz	vcls	voiceless
imp	imperative	voi	voice
intr	intransitive	1	first person
lat	lateral	2	second person
lo	low	3	third person
loc	locative		