

LIN301

PHONOLOGY



Download on the
App Store



GET IT ON
Google Play

Course video is available on our app

lanetonline.com

Course code: LIN 301
Course title: Phonology
Course credit load: 2 Units

Series 1: Foundations of Phonological Knowledge

Series 2: Analyzing Sound Patterns and Systems

Series 3: Principles and Methodologies of Phonological Analysis

Series 4: Conceptual Frameworks in Phonology

Series 5: Applied Phonological Discovery and Production

Proposed Outline for Series 1

Part .1 Conventions and Vocabulary in Phonology

- 1.1.1 Phonological conventions
- 1.1.2 Key phonological vocabulary
- 1.1.3 Units of phonological analysis

Part .2 Identifying and Segmenting Sounds

- 1.2.1 Observing speech flow
- 1.2.2 Segmenting sounds into units
- 1.2.3 Distinguishing phonemes and allophones

Part .3 Sound Patterns and Behaviour

- 1.3.1 Description of sound patterns
- 1.3.2 Behaviour of sounds in systems
- 1.3.3 Examples from different languages

Part .4 Analytical Skills in Phonology

- 1.4.1 Asking questions and observing data
- 1.4.2 Identifying patterns and regularities
- 1.4.3 Drawing generalisations

Introduction

Language is built upon sound, and the way sounds are organised gives structure and meaning to communication. Phonology, the study of sound systems, provides the foundation for understanding how languages function and how speakers produce and interpret speech. This Series introduces you to the essential building blocks of phonological knowledge, preparing you to engage with more advanced aspects of sound analysis later in the course. By beginning here, you will be



equipped with the tools to recognise conventions, identify sound units, and appreciate the systematic behaviour of sounds across languages.

The aim of this Series is to familiarise you with the fundamental conventions, vocabulary, and analytical skills of phonology. It seeks to build your competence in observing, segmenting, and describing sounds, while also guiding you towards recognising patterns and developing analytical insights.

We shall commence this Series by exploring the conventions and vocabulary that underpin phonological study. Next, we will move on to identifying and segmenting sounds in the speech flow, paying attention to how phonemes and allophones are distinguished. Following that, we will examine sound patterns and behaviours, considering how they operate within different systems. Finally, we will wrap up by developing analytical skills that enable you to ask questions, observe data, identify regularities, and draw meaningful generalisations. This progression ensures that you gain a solid foundation before advancing to the subsequent Series in the course.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 1.1** define key phonological conventions and terminology with accuracy,
- **SLO 1.2** explain the role of units in phonological analysis,
- **SLO 1.3** demonstrate how to observe and segment sounds in the speech flow,
- **SLO 1.4** analyse the distinction between phonemes and allophones using examples,
- **SLO 1.5** describe sound patterns and behaviours within phonological systems, and
- **SLO 1.6** apply analytical skills to identify regularities and draw generalisations from phonological data.

1.1 Conventions and Vocabulary in Phonology

Phonology begins with a shared set of conventions and vocabulary that allow linguists to describe and analyse the sound systems of languages. Without these conventions, it would be difficult to communicate findings or compare data across different languages. In this Part, we will explore the basic conventions used in phonology, introduce key vocabulary, and examine the units of phonological analysis.

1.1.1 Phonological conventions

Conventions in phonology are agreed rules and practices that guide how sounds are represented and discussed. For example, linguists use the **International Phonetic Alphabet (IPA)**, a system of symbols that represent speech sounds consistently across languages. This ensures that when you see a symbol, you know exactly which sound it refers to, regardless of the spelling in a particular language.



Another important convention is the use of slashes and square brackets. **Phonemes** are written between slashes, such as /p/, while **phones** (actual speech sounds) are written in square brackets, such as [p]. This distinction helps us separate abstract mental categories from their physical realisations.

Fill in the blank: Phonemes are written between _____, while phones are written in _____.

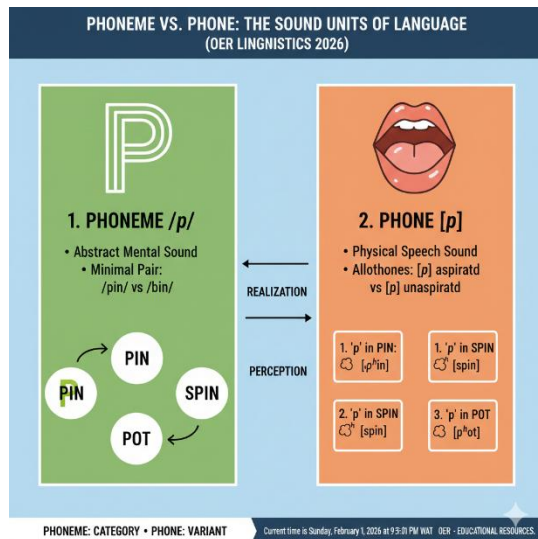


Figure 1.1 Distinction between phonemes and phones

1.1.2 Key phonological vocabulary

Phonology relies on a specialised vocabulary that learners must master early.

- **Phoneme:** The smallest unit of sound that can distinguish meaning in a language. For example, /p/ and /b/ distinguish ‘pat’ from ‘bat’.
- **Allophone:** A variation of a phoneme that does not change meaning. For instance, the aspirated [p^h] in ‘pin’ and the unaspirated [p] in ‘spin’ are allophones of /p/.
- **Minimal pair:** Two words that differ by only one sound, such as ‘bat’ and ‘pat’. Minimal pairs are used to test whether two sounds are distinct phonemes.
- **Phonotactics:** The rules governing permissible sound combinations in a language. For example, English allows /str/ at the beginning of words (‘street’), but not /tl/.

Fill in the blank: The words ‘bat’ and ‘pat’ form a _____ pair because they differ by only one sound.



**Box 1.1 Selected Phonological Vocabulary
(OER Linguistics 2026)**

Term	Concise Definition
Phoneme	An abstract mental sound unit that distinguishes meaning (e.g., /p/ in 'pin' vs 'bin')
Allophone	A physical variant of a phoneme that doesn't change meaning (e.g., [p ^h] unaspirated)
Minimal Pair	Two words that differ by only one sound, showing distinct phonemes (e.g., 'pin' vs 'bin')
Phonotactics	Rules for how sounds can combine in language ('str' is allowed, 'stn' is not)

KEY CONCEPTS IN THE SOUND STRUCTURE OF LANGUAGE

Current time is Sunday, February 1, 2026 at 9:55:16 PM WAT. OER - OPEN EDUCATIONAL RESOURCES

Box 1.1 Selected phonological vocabulary A table-style box listing phoneme, allophone, minimal pair, phonotactics with concise definitions.

1.1.3 Units of phonological analysis

Phonology is concerned with identifying the **units** that make up sound systems. These units include phonemes, syllables, and features.

- **Syllable:** A unit of organisation for speech sounds, typically containing a vowel and optional consonants. For example, the word 'cat' has one syllable, while 'banana' has three.
- **Distinctive features:** The smallest properties of sounds that distinguish one phoneme from another. For example, /p/ and /b/ differ in voicing: /p/ is voiceless, /b/ is voiced.
- **Prosodic units:** Larger structures such as stress, intonation, and rhythm that influence how sounds are organised in speech.

Fill in the blank: The difference between /p/ and /b/ lies in the distinctive feature of _____.

Features	Values	Members
Manner	Fricative	[f, s, ʃ, v, z, ʒ]
	Nasal	[m, n]
	Plosive	[p, t, k, b, d, g]
	Approx.	[ɹ, l]
Place	Labial	[p, b, f, v, m]
	Coronal	[t, d, s, z, ʃ, ʒ, n, l]
	Dorsal	[k, g, ɣ]
Voicing	Voiced	[b, d, g, v, z, ʃ, ʒ, l, m, n]
	Unvoiced	[p, t, k, f, s, ʃ]

doi:10.1371/journal.pone.0079279.t002



Table 1.1 Distinctive features of selected phonemes Table comparing /p/, /b/, /t/, /d/ with features such as voicing, place of articulation, and manner of articulation.

Pilot questions 1.1

1. Which convention is used to represent speech sounds consistently across languages?
2. What is the difference between a phoneme and a phone?
3. Give an example of a minimal pair in English.
4. What term refers to permissible sound combinations in a language?
5. Which distinctive feature differentiates /p/ from /b/?

1.2 Identifying and Segmenting Sounds

Phonology requires us to carefully observe the continuous flow of speech and break it down into meaningful units. This Part will guide you in recognising how sounds are produced, how they can be segmented, and how distinctions between them are identified. By learning these skills, you will be able to analyse speech data more effectively and prepare for deeper phonological study.

1.2.1 Observing speech flow

Speech is a continuous stream of sound, yet listeners perceive it as organised into words and syllables. To study phonology, we must learn to observe this flow and recognise where one sound ends and another begins. Careful listening, aided by recording tools and phonetic transcription, allows us to capture the fine details of speech.

Fill in the blank: Speech is often described as a continuous _____ of sound that must be segmented for analysis.

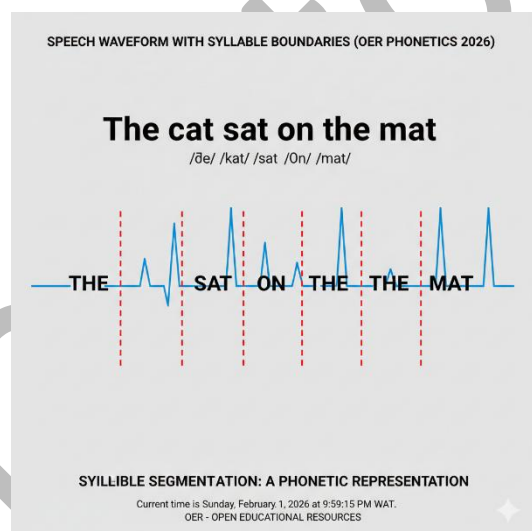


Plate 1.1 Observing the flow of speech



1.2.2 Segmenting sounds into units

Segmentation is the process of dividing speech into smaller units such as phonemes, syllables, or morphemes. This is essential because phonological analysis depends on identifying the smallest meaningful sound units. For example, the word ‘cats’ can be segmented into /k/, /æ/, /t/, and /s/.

Segmentation is not always straightforward, as sounds may overlap or blend in natural speech. Phonologists rely on transcription systems and analytical conventions to make segmentation consistent.

Fill in the blank: The word ‘cats’ can be segmented into the phonemes /k/, /æ/, /t/, and _____.

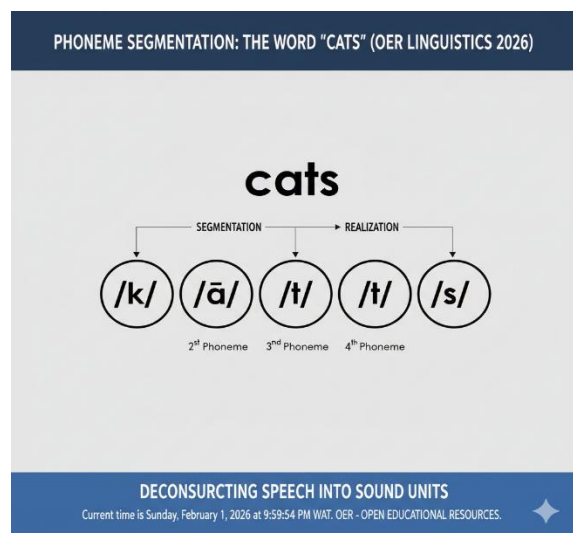


Figure 1.2 Segmentation of sounds in a word

1.2.3 Distinguishing phonemes and allophones

A crucial skill in phonology is distinguishing between **phonemes** and **allophones**. As explained earlier, phonemes are abstract categories that distinguish meaning, while allophones are variations of a phoneme that do not change meaning. For instance, the aspirated [p^h] in ‘pin’ and the unaspirated [p] in ‘spin’ are both allophones of the phoneme /p/.

Phonologists use **minimal pairs** to test whether two sounds are distinct phonemes. If replacing one sound with another changes the meaning of a word, the sounds represent different phonemes.

Fill in the blank: The aspirated [p^h] in ‘pin’ and the unaspirated [p] in ‘spin’ are _____ of the phoneme /p/.



are nemes d allophones?

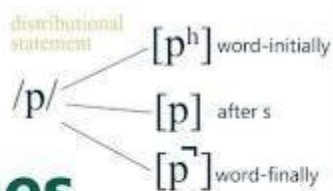


Table 1.2 Examples of phonemes and allophones Table comparing phoneme /p/ with its allophones [pʰ] and [p̚], including word examples.

Pilot questions 1.2

1. What term describes the continuous stream of sound in speech?
2. What is the process of dividing speech into smaller units called?
3. Segment the word 'dogs' into its phonemes.
4. What test is used to determine whether two sounds are distinct phonemes?
5. Give one example of an allophone of the phoneme /p/.

1.3 Sound Patterns and Behaviour

Phonology is not only about identifying individual sounds, but also about recognising how these sounds interact and behave within a language system. In this Part, we will examine the description of sound patterns, explore the behaviour of sounds in different contexts, and consider examples from various languages. This will help you appreciate the systematic nature of phonological organisation.

1.3.1 Description of sound patterns

Sound patterns refer to the regular ways in which sounds are organised and combined in a language. For example, in English, consonant clusters such as /str/ are common at the beginning of words, while other combinations like /tl/ are not permitted. These patterns are shaped by the phonotactic rules of each language.

Phonologists describe sound patterns by observing recurring sequences and noting restrictions. This description provides insight into the structure of a language and helps explain why certain words are possible while others are not.

Fill in the blank: The cluster /str/ is permitted in English, but the cluster _____ is not.



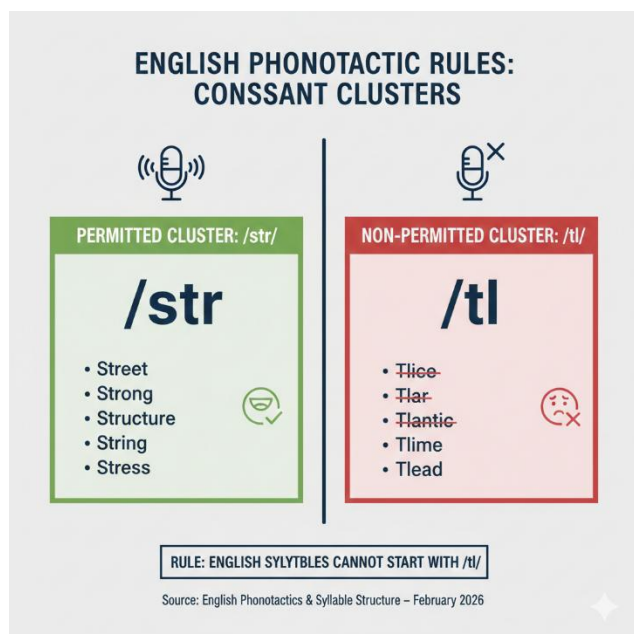


Figure 1.3 Examples of sound patterns in English

1.3.2 Behaviour of sounds in systems

The **behaviour of sounds** refers to how they change depending on their environment. For instance, the English plural morpheme is pronounced as [s] in ‘cats’, [z] in ‘dogs’, and [ɪz] in ‘horses’. This variation is conditioned by the surrounding sounds.

Such behaviours are explained through phonological rules, which capture the systematic changes that occur. These rules show that sounds are not static, but dynamic elements influenced by context.

Fill in the blank: The plural morpheme in English is pronounced as [s], [z], or _____ depending on the environment.



ENGLISH PLURA MORPHEME ALLOMORHS
Source: English Phonology & Morapology – February 2026

PLURAL FORM	EXAMPLES	CONDITIONING ENVIRONMENT
[s]	cats books maps	After voiceless sounds /b, d, g, v, v, dd, ð, m, n, n/ r/ and vouvels
[z]	dogs chairs bags	After sibilant sounds /s, z, ʒ/ tch, dʒ/
[ɪz]	horses bushes judges	

Table 1.3 Behaviour of the English plural morpheme

1.3.3 Examples from different languages

Different languages exhibit unique sound patterns and behaviours. For example, in Japanese, words rarely end with consonant clusters, while in English such clusters are common. In Yoruba, vowel harmony influences how vowels co-occur within words. These examples highlight the diversity of phonological systems and the importance of studying them comparatively.

Fill in the blank: In Yoruba, _____ harmony influences how vowels co-occur within words.

YORUBA VOWEL HARMONY
Source: Yoruba Phonology & Morapology – February 2026

FRONT VOWEL HARMONY	BACK VOWEL HARMONY
ilé → (house) omi (water) ewé (leaf) leaf	odó → (mortar) igbó → (forest) ojú → (face)
RULE: Vowels within a word must agree in tongue root position (ATR).	

Date: Sunday, February 1, 2026 at 10:29:50 PM WAT

Plate 1.2 Vowel harmony in Yoruba



Pilot questions 1.3

1. What term refers to the regular organisation of sounds in a language?
2. Give one example of a permitted consonant cluster in English.
3. How does the English plural morpheme vary in pronunciation?
4. Which language rarely permits consonant clusters at the end of words?
5. What type of harmony influences vowel co-occurrence in Yoruba?

1.4 Analytical Skills in Phonology

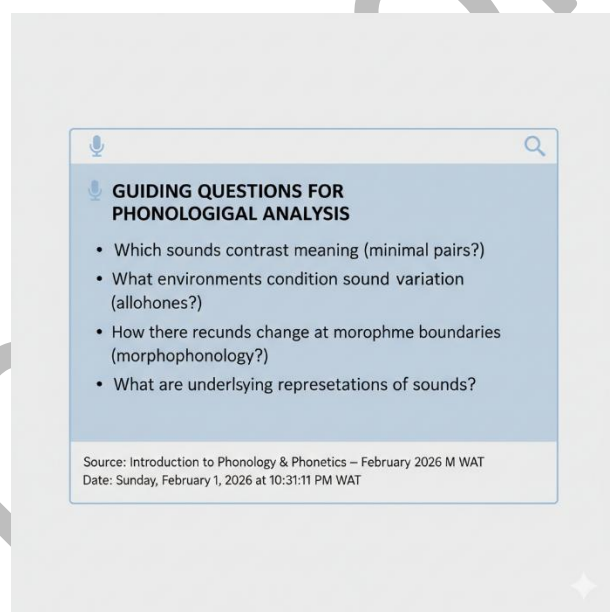
Phonology is not only about recognising sounds and patterns, but also about developing the ability to analyse them critically. This Part will help you build skills in asking the right questions, observing data carefully, identifying patterns and regularities, and drawing generalisations. These analytical skills are essential for progressing from basic observation to meaningful interpretation of phonological systems.

1.4.1 Asking questions and observing data

The first step in analysis is to ask clear and focused questions. For example, you might ask: “Does this sound occur in all environments, or only in specific contexts?” By framing questions in this way, you guide your observation and ensure that your data collection is purposeful.

Observation involves listening closely to speech, transcribing accurately, and noting variations. Careful observation prevents errors and ensures that your analysis is based on reliable evidence.

Fill in the blank: Effective analysis begins with asking clear and _____ questions about the data.



The screenshot shows a digital interface with a search bar at the top. Below it, a blue box contains the title "GUIDING QUESTIONS FOR PHONOLOGICAL ANALYSIS" and a list of four bullet points: "Which sounds contrast meaning (minimal pairs?)", "What environments condition sound variation (allophones?)", "How there recunds change at morophme boundaries (morphophonology?)", and "What are underlsyng represetations of sounds?". At the bottom of the blue box, it says "Source: Introduction to Phonology & Phonetics – February 2026 M WAT" and "Date: Sunday, February 1, 2026 at 10:31:11 PM WAT".

Box 1.2 Sample analytical questions in phonology



1.4.2 Identifying patterns and regularities

Once data is observed, the next step is to identify **patterns** and **regularities**. Patterns may include recurring sound sequences, predictable changes, or restrictions on combinations. For instance, in English, voiced consonants rarely occur at the end of words, while in other languages they may be common.

Recognising regularities allows you to propose rules that explain the behaviour of sounds. These rules form the backbone of phonological analysis.

Fill in the blank: In English, voiced consonants rarely occur at the _____ of words.

ENGLISH WORD-FINAL CONSONANT VOICING
Source: English Phonology & Phonetics – February 2026

PERMITTED: VOICED & VOICELESS			
	Voiced		Voiceless
Cap	/b, d, g, v, z/	Cap	/p, t, k, f s/
Sad	Dog	Mat	-
Dog	Love	Bank	Roof
	Faze		Class

NON-PERMITTED: NO DEVOICING

- English does NOT devoice final voiced consonants.

Rule: Voiced consonants remain voiced word-finally, e.g., /dog/ is pronounced [dog], not, [dok].

Date: Sunday, February 1, 2026 at 10:32:49 PM WAT

Figure 1.4 Voicing restrictions in English word-final consonants

1.4.3 Drawing generalisations

The final step in analysis is to draw **generalisations**. A generalisation is a statement that summarises the behaviour of sounds across contexts. For example, you might generalise that “nasal vowels occur only before nasal consonants in this language.”

Generalisations must be supported by evidence and should be tested against new data. They help you move from specific observations to broader insights about the sound system of a language.

Fill in the blank: A generalisation is a statement that summarises the _____ of sounds across contexts.



PHONOLOGICAL GENERALISATIONS		
Source: Introduction to Phonology - February 2026		
GENERALISATION	RULE DESCRIPTION	SUPPORTING EVIDENCE (ENGLISH)
1. Nasal vowels occur before nasal consonants.	Vowels become nasalised when followed by a nasal consonant within the same syllable	• 'can' [kʌ̃n] vs. 'cat' [kʌt] • 'dog' [dɒg] vs 'sip' [dɒk]
2. Word-final obstruents exhibit voicing restrictions	English does NOT devoice word-final voiced obstruents	• cab [kʌb] not [kʌp] High vowels /i, u/ are devoiced after voiceless stops and before a pause • 'stop' [stɒp] [stɒp̚] cake [keɪk] [keɪk̚]
3. High vowels are devoiced in certain contexts		

Table 1.4 Examples of phonological generalisations

Pilot questions 1.4

1. Why is it important to ask clear questions before analysing phonological data?
2. What term refers to recurring sound sequences or restrictions in a language?
3. Give one example of a voicing restriction in English.
4. What is a generalisation in phonology?
5. How should generalisations be tested to ensure accuracy?

Series Summary

This Series has introduced you to the foundations of phonological knowledge, providing the essential tools and concepts needed to study sound systems in language. Its purpose was to familiarise you with conventions, vocabulary, and analytical approaches that form the basis of phonological study, ensuring you are well prepared for more advanced exploration in subsequent Series.

We began by examining phonological conventions and vocabulary, then moved on to identifying and segmenting sounds in the speech flow. Following that, we explored sound patterns and behaviours, considering how they operate within different systems, and finally we developed analytical skills for asking questions, identifying regularities, and drawing generalisations. By completing this Series, you should now be able to define key conventions and terminology, explain the role of phonological units, demonstrate segmentation of sounds, analyse distinctions between phonemes and allophones, describe sound patterns and behaviours, and apply analytical skills to identify patterns and generalise from data, as outlined in the Series Learning Outcomes.

Glossary of Terms



Allophone: A variation of a phoneme that does not change the meaning of a word. For example, the aspirated [p^h] in ‘pin’ and the unaspirated [p] in ‘spin’ are allophones of the phoneme /p/.

Conventions: Agreed rules and practices used in phonology to represent and analyse sounds. Examples include the use of the International Phonetic Alphabet (IPA) and the distinction between phonemes written in slashes / / and phones written in square brackets [].

Distinctive features: The smallest properties of sounds that differentiate one phoneme from another, such as voicing, place of articulation, or manner of articulation.

Minimal pair: Two words that differ by only one sound, showing that the sounds involved are distinct phonemes. For example, ‘bat’ and ‘pat’.

Phoneme: The smallest unit of sound in a language that can distinguish meaning. For instance, /p/ and /b/ distinguish ‘pat’ from ‘bat’.

Phonotactics: The rules that govern which sound combinations are allowed in a language. For example, English permits /str/ at the beginning of words but not /tl/.

Phone: An actual speech sound as it is physically produced, represented in square brackets, such as [p].

Prosodic units: Larger structures in speech such as stress, intonation, and rhythm that influence how sounds are organised and perceived.

Segmentation: The process of dividing continuous speech into smaller units such as phonemes, syllables, or morphemes for analysis.

Sound patterns: Regular ways in which sounds are organised and combined in a language, shaped by phonotactic rules and other constraints.

Syllable: A unit of organisation for speech sounds, typically containing a vowel and optional consonants. For example, ‘cat’ has one syllable, while ‘banana’ has three.

Waveform: A visual representation of the flow of speech, showing how sounds vary over time and helping to identify boundaries between units.

Concept Check Questions [Series 1]

Objective questions

1. Which convention is used to represent speech sounds consistently across languages? (Linked to SLO 2.1)
2. Phonemes are written between _____, while phones are written in _____. (Linked to SLO 2.1)



3. The words ‘bat’ and ‘pat’ form a _____ pair because they differ by only one sound. (Linked to SLO 2.2)
4. Which distinctive feature differentiates /p/ from /b/? (Linked to SLO 2.2)
5. In English, the plural morpheme is pronounced as [s], [z], or _____ depending on the environment. (Linked to SLO 2.5)

Short-answer questions

6. Define the term “allophone” and give one example from English. (Linked to SLO 2.4)
7. Explain what segmentation means in phonology and illustrate with the word ‘dogs’. (Linked to SLO 2.3)
8. Describe one phonotactic restriction in English and explain its significance. (Linked to SLO 2.5)
9. What is a generalisation in phonology, and why is it important? (Linked to SLO 2.6)

Long-answer questions

10. Analyse the behaviour of the English plural morpheme, showing how its pronunciation varies depending on the phonological environment. (Linked to SLO 2.5)
11. Evaluate the importance of minimal pairs in distinguishing phonemes, using examples from English and one other language of your choice. (Linked to SLO 2.4)
12. Design a simple analytical framework for observing phonological data, identifying patterns, and drawing generalisations. (Linked to SLO 2.6)

Answers to Concept Check Questions [Series 1]

Objective questions

1. International Phonetic Alphabet (IPA).
2. Phonemes are written between slashes / /, while phones are written in square brackets [].
3. Minimal pair.
4. Voicing.
5. [ɪz].

Short-answer questions

6. An allophone is a variation of a phoneme that does not change meaning. Example: [p^h] in ‘pin’ and [p] in ‘spin’ are allophones of /p/.
7. Segmentation is the process of dividing speech into smaller units. The word ‘dogs’ can be segmented into /d/, /ɒ/, /g/, /z/.
8. English does not permit /tɫ/ at the beginning of words. This restriction shows how phonotactic rules shape possible word structures.
9. A generalisation is a statement that summarises the behaviour of sounds across contexts. It is important because it allows phonologists to explain and predict sound behaviour systematically.

Long-answer questions



10. *Basic response:* The English plural morpheme varies as [s] after voiceless consonants (cats), [z] after voiced consonants (dogs), and [ɪz] after sibilants (horses). *Value-added response:* This variation illustrates assimilation, where the plural morpheme adapts to the voicing or sibilant quality of the preceding sound. It demonstrates how phonological rules maintain ease of articulation and systematic organisation.
11. *Basic response:* Minimal pairs such as ‘bat’ and ‘pat’ show that /b/ and /p/ are distinct phonemes in English. *Value-added response:* In Hausa, minimal pairs like ‘bari’ (leave) and ‘pari’ (finish) demonstrate phonemic contrasts. Minimal pairs are crucial across languages because they provide direct evidence of phoneme status and help linguists establish sound inventories.
12. *Basic response:* An analytical framework involves asking guiding questions, observing data, identifying patterns, and drawing generalisations. *Value-added response:* A more advanced framework may include systematic transcription using IPA, testing hypotheses with minimal pairs, applying distinctive feature analysis, and comparing across languages to refine generalisations. This approach ensures both accuracy and broader applicability in phonological study.

Answers to Pilot Questions [Series 1]

Part 1.1 Conventions and Vocabulary in Phonology

1. International Phonetic Alphabet (IPA).
2. Phonemes are written between slashes / /, while phones are written in square brackets [].
3. ‘Bat’ and ‘pat’.
4. Phonotactics.
5. Voicing.

Part 1.2 Identifying and Segmenting Sounds

1. Stream.
2. Segmentation.
3. /s/.
4. Minimal pair test.
5. Allophones.

Part 1.3 Sound Patterns and Behaviour

1. Sound patterns.
2. /str/.
3. [s], [z], [ɪz].
4. Japanese.
5. Vowel harmony.

Part 1.4 Analytical Skills in Phonology

1. Focused.
2. Patterns.
3. Word-final position.



4. Behaviour.
5. Against new data.

References and Attributions [Series 1]

General References International Phonetic Association. (1999). *Handbook of the International Phonetic Association: A guide to the use of the International Phonetic Alphabet*. Cambridge University Press. Ladefoged, P., & Johnson, K. (2014). *A course in phonetics* (7th ed.). Cengage Learning. Odden, D. (2005). *Introducing phonology*. Cambridge University Press.

Illustrations

- *Figure 1.1 Distinction between phonemes and phones* AI-generated using prompt: “Create a simple diagram showing phoneme /p/ and phone [p] with English word examples.” Suggested OER source: “phoneme vs phone diagram OER linguistics.”
- *Box 1.1 Selected phonological vocabulary* AI-generated using prompt: “Generate a clean glossary-style box with four phonological terms and definitions.” Suggested OER source: “phonology glossary OER linguistics.”
- *Table 1.1 Distinctive features of selected phonemes* AI-generated using prompt: “Create a table comparing phonemes /p/, /b/, /t/, /d/ with voicing, place, manner features.” Suggested OER source: “distinctive features phonemes table OER linguistics.”
- *Plate 1.1 Observing the flow of speech* AI-generated using prompt: “Generate a waveform image of an English sentence with syllable boundaries marked.” Suggested OER source: “speech waveform syllable boundaries OER phonetics.”
- *Figure 1.2 Segmentation of sounds in a word* AI-generated using prompt: “Create a diagram showing segmentation of the word ‘cats’ into phonemes /k/, /æ/, /t/, /s/.” Suggested OER source: “phoneme segmentation diagram OER linguistics.”
- *Table 1.2 Examples of phonemes and allophones* AI-generated using prompt: “Create a table comparing phoneme /p/ with allophones [p^h] and [p] using English word examples.” Suggested OER source: “phoneme vs allophone examples table OER linguistics.”
- *Figure 1.3 Examples of sound patterns in English* AI-generated using prompt: “Create a diagram showing permitted consonant cluster /str/ and non-permitted cluster /tl/ in English.” Suggested OER source: “phonotactic rules consonant clusters OER linguistics.”
- *Table 1.3 Behaviour of the English plural morpheme* AI-generated using prompt: “Create a table showing plural morpheme behaviour in English with examples cats, dogs, horses.” Suggested OER source: “English plural morpheme phonology table OER linguistics.”
- *Plate 1.2 Vowel harmony in Yoruba* AI-generated using prompt: “Generate an image showing examples of vowel harmony in Yoruba words with glosses.” Suggested OER source: “Yoruba vowel harmony examples OER linguistics.”
- *Box 1.2 Sample analytical questions in phonology* AI-generated using prompt: “Generate a box listing sample guiding questions for phonological analysis.” Suggested OER source: “phonology analytical questions OER linguistics.”



- *Figure 1.4 Voicing restrictions in English word-final consonants* AI-generated using prompt: “Create a diagram showing English words ending with consonants, highlighting voicing restrictions.” Suggested OER source: “English word-final consonants voicing OER phonology.”
- *Table 1.4 Examples of phonological generalisations* AI-generated using prompt: “Create a table listing examples of phonological generalisations with supporting evidence.” Suggested OER source: “phonological generalisations examples OER linguistics.”

Course code: LIN 301

Course title: Phonology

Course credit load: 2 Units

Series 1: Foundations of Phonological Knowledge

Series 2: Analyzing Sound Patterns and Systems

Series 3: Principles and Methodologies of Phonological Analysis

Series 4: Conceptual Frameworks in Phonology

Series 5: Applied Phonological Discovery and Production

Proposed Outline for Series 2

Part .1 Phonotactic Rules and Constraints

- 2.1.1 Definition and scope of phonotactics
- 2.1.2 Permissible and impermissible sound combinations
- 2.1.3 Cross-linguistic examples of phonotactic variation

Part .2 Morphophonemic Alternations

- 2.2.1 Definition of morphophonemics
- 2.2.2 Alternations in English (plural, past tense, etc.)
- 2.2.3 Alternations in other languages

Part .3 Prosodic Features and Sound Organisation

- 2.3.1 Stress patterns
- 2.3.2 Intonation and rhythm
- 2.3.3 Interaction of prosody with phonological systems

Part .4 Comparative Sound Systems

- 2.4.1 Case studies of selected languages



- 2.4.2 Identifying similarities and differences
- 2.4.3 Implications for phonological theory

Introduction

In the last Series, we explored the foundations of phonological knowledge, focusing on conventions, vocabulary, segmentation, sound behaviour, and analytical skills. Building on that foundation, this Series takes you further into the study of how sounds are organised into patterns and systems. Understanding these patterns is crucial because they reveal the rules and structures that govern spoken language, and they allow us to compare how different languages manage sound organisation.

The aim of this Series is to equip you with the ability to analyse sound patterns systematically, to explain how phonological rules operate within and across languages, and to evaluate the role of prosodic features in shaping sound systems.

We shall commence this Series by examining phonotactic rules and constraints, which determine permissible and impermissible sound combinations. Next, we will move on to morphophonemic alternations, exploring how sounds change when morphemes interact in words. Following that, we will study prosodic features such as stress, intonation, and rhythm, and consider how they influence sound organisation. Finally, we will wrap up by comparing sound systems across selected languages, identifying similarities and differences, and reflecting on their implications for phonological theory. This progression ensures that you gain a deeper and more comprehensive understanding of sound patterns and systems.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 2.1** define phonotactic rules and explain their role in shaping permissible sound combinations,
- **SLO 2.2** analyse examples of phonotactic constraints across different languages,
- **SLO 2.3** describe morphophonemic alternations and demonstrate how they operate in English,
- **SLO 2.4** apply knowledge of morphophonemic alternations to examples from other languages,
- **SLO 2.5** explain prosodic features such as stress, intonation, and rhythm,
- **SLO 2.6** evaluate the interaction of prosodic features with phonological systems, and
- **SLO 2.7** compare sound systems across selected languages and identify similarities and differences.



2.1 Phonotactic Rules and Constraints

Phonotactics is a central concept in phonology because it explains why certain sound combinations are possible in a language while others are not. In this Part, we will define phonotactic rules, explore permissible and impermissible sound combinations, and examine cross-linguistic examples to highlight variation across languages.

2.1.1 Definition and scope of phonotactics

Phonotactics refers to the set of rules that govern how sounds can be arranged in a language. These rules determine which sequences of consonants and vowels are acceptable and which are not. For example, English allows the cluster /str/ at the beginning of words such as ‘street’, but does not permit /tl/ in the same position.

Phonotactic rules are language-specific, meaning that what is acceptable in one language may be impossible in another. They provide insight into the structure of a language and help linguists understand how speakers intuitively judge whether a word “sounds right” or not.

Fill in the blank: The cluster /str/ is permitted at the beginning of English words, but the cluster _____ is not.

The infographic is titled "ENGLISH PHONO-TACTIC RULES: CONSONANT CLUSTERS". It is divided into two main sections: "PERMITTED CLUSTER: /str/" and "IMPERMISSIBLE CLUSTER: /tl/".

PERMITTED CLUSTER: /str/ (Green background, microphone icon, green checkmark):

- Street
- Strong
- Structure
- String
- Stress

IMPERMISSIBLE CLUSTER: /tl/ (Red background, microphone icon with a red X, red X):

- Tlice
- Tlar
- atnatic
- Tlime
- Tlead

RULE: ENGLISH SYLLABLES CANNOT START WITH /tl/

Source: English Phonotactics & Syllable Structure - February 2026
Date: Sunday, February 1, 2026 at 10:36:04 PM WAT

Figure 2.1 Examples of phonotactic rules in English

2.1.2 Permissible and impermissible sound combinations

Phonotactic rules specify which sound combinations are **permissible** (allowed) and which are **impermissible** (not allowed). For instance, in Japanese, words rarely end with consonant clusters, while in English such clusters are common. Similarly, Yoruba restricts certain vowel sequences due to vowel harmony.



These restrictions are not arbitrary. They reflect the phonological system of each language and often serve to maintain ease of articulation and clarity in communication.

Fill in the blank: In Japanese, words rarely end with _____ clusters, while in English such clusters are common.

Language	Permissible Sequences	Impermissible Sequences	Phonotactic Rule
English	"Strength" /streŋθ/ (Complex clusters of up to 3 consonants at the start).	/tʃ/ or /bŋ/ at the start of a syllable (e.g., <i>"Tlar"</i> or <i>"Bnap"</i>).	Allows complex onsets and codas (CCCVCCCC), but restricts specific combinations like stop+liquid in onsets.
Japanese	"Honda" /hon.da/ (Consonant + Vowel + Nasal coda).	/st/ or /br/ clusters (e.g., <i>"strike"</i> becomes <i>"sutoraiki"</i>).	Syllable structure is strictly (C)V(N). Consonant clusters are not allowed; vowels are inserted to break them up.
Yoruba	"Adé" /ā.dé/ (Vowel or Consonant + Vowel).	Word-final consonants (e.g., <i>"book"</i> is often adapted as <i>"búùkù"</i>).	Strictly open syllables (CV or V). No consonant clusters and no consonants allowed at the end of words.

Table 2.1 Examples of permissible and impermissible sound combinations

2.1.3 Cross-linguistic examples of phonotactic variation

Cross-linguistic comparison shows the diversity of phonotactic systems. For example, in Hawaiian, words typically end with vowels, while in Russian, consonant clusters at the beginning of words can be very complex. These differences highlight how phonotactic rules shape the “sound character” of each language.

By studying these variations, learners can appreciate the uniqueness of each language and understand how phonotactic rules contribute to linguistic identity.

Fill in the blank: In Hawaiian, words typically end with _____, while in Russian, complex consonant clusters are common at the beginning of words.



CROSS-LINGUISTIC PHONOTACTIC VARIATION

Source: Introduction to Phonology - February 2026

HAWAIIAN: VOWEL-FINAL WORDS (OPEN SYLLABLES)	RUSSIAN: INITIAL CONSONANT CLUSTERS
 • Hawai'i • Aloha • Aloha • Kai • Lu'au • Mele	 • Здравствуй (Hello) • Встреча (Meeting) • Просить (To ask) • Просить (To ask) • Класс • Глава
Rule: All syllables must end vowel	Rule: Allows complex clusters of up to 4 consonants initially

All syllables must end in vowel

Source: English Phonotactics & Syllable Structure - February 2026
Date: Sunday, February 1, 2026 at 10:36:04 PM WAT

Plate 2.1 Cross-linguistic phonotactic variation

Pilot questions 2.1

1. What term refers to the rules governing permissible sound sequences in a language?
2. Give one example of a consonant cluster permitted in English.
3. Which language rarely permits words ending with consonant clusters?
4. What phonological feature restricts certain vowel sequences in Yoruba?
5. In Hawaiian, words typically end with what type of sound?

2.2 Morphophonemic Alternations

Morphophonemics deals with how sounds change when morphemes combine in words. These alternations are systematic and predictable, reflecting the interaction between morphology (word structure) and phonology (sound system). In this Part, we will define morphophonemics, examine alternations in English, and explore examples from other languages to highlight cross-linguistic variation.

2.2.1 Definition of morphophonemics

Morphophonemics refers to the study of sound changes that occur when morphemes are combined. A **morpheme** is the smallest meaningful unit of language, such as the plural suffix -s in English. When morphemes interact, the sounds may change depending on the phonological environment.

For example, the plural morpheme in English can be realised as [s], [z], or [ɪz]. These changes are not random, but governed by phonological rules that ensure ease of articulation and consistency.

Fill in the blank: Morphophonemics studies how sounds change when _____ are combined in words.



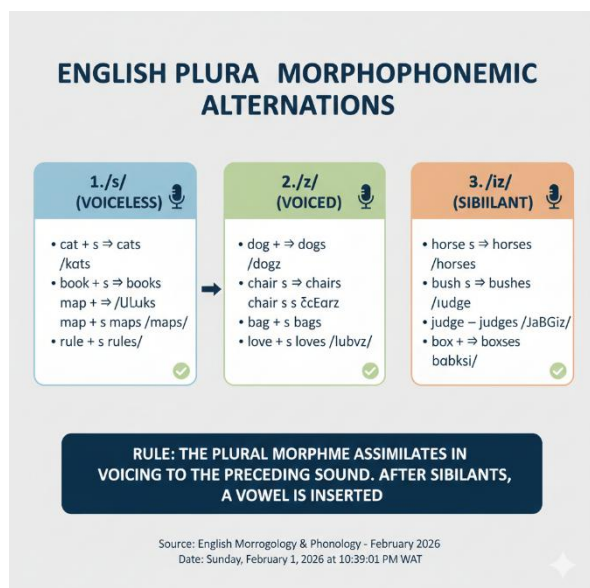


Figure 2.2 Morphophonemic alternations in English plurals

2.2.2 Alternations in English (plural, past tense, etc.)

English provides clear examples of morphophonemic alternations.

- **Plural morpheme:** realised as [s] after voiceless consonants (cats), [z] after voiced consonants (dogs), and [ɪz] after sibilants (horses).
- **Past tense morpheme:** realised as [t] after voiceless consonants (walked), [d] after voiced consonants (played), and [ɪd] after alveolar stops (wanted).

These alternations demonstrate how phonological rules adapt morphemes to fit the surrounding sounds.

Fill in the blank: The past tense morpheme in English is pronounced as [t], [d], or _____ depending on the environment.

Morpheme	Allomorph	Conditioning Environment	Examples
Plural (/s/)	[s]	After voiceless non-sibilant consonants.	cats, books, maps, graphs
	[z]	After voiced non-sibilant sounds (vowels & voiced consonants).	dogs, bins, shells, bees
	[ɪz]	After sibilants (hissing/hushing sounds: /s, z, ʃ, ʒ, tʃ, dʒ/).	horses, bushes, judges, boxes



Morpheme	Allomorph	Conditioning Environment	Examples
Past Tense (/ed/)	[t]	After voiceless sounds (except /t/).	walked, laughed, kissed, tapped
	[d]	After voiced sounds (except /d/).	played, robbed, hummed, seized
	[əd] or [ɪd]	After alveolar stops (/t/ or /d/).	waited, added, landed, started

Table 2.2 Morphophonemic alternations in English

2.2.3 Alternations in other languages

Morphophonemic alternations are common across languages.

- In Turkish, vowel harmony affects suffixes, so the plural suffix -ler/-lar changes depending on the vowel in the root word.
- In Hausa, tone alternations occur when morphemes combine, influencing meaning and grammatical function.
- In French, liaison causes normally silent consonants to be pronounced when followed by a vowel, as in *les amis* [lezami].

These examples show that morphophonemic alternations are a universal phenomenon, though the specific rules vary across languages.

Fill in the blank: In Turkish, vowel _____ affects how suffixes are pronounced when added to root words.

TURKISH VOWEL HARMONY & PLURAL SUFFIX ALTERNATIONS

Source: Turkish Phonology & Morphology - February 2026 /
Date: Sunday, February 1, 2026 at 10:40:44 PM WAT

FRONT VOWEL HARMONY
-ler

ev → evler (houses)

göz → gözler (eyes)

göz → gözler (eyes)

şehir → şehirler (cities)

BACK VOWEL HARMONY
-lar

kitap → kitaplar (books)

kitap → kitaplar (books)

ağaç → ağaçlar (trees)

okul → okullar (schools)

RULE: THE PLURAL SUFFIX ALMOST ALWAYS HARMONIZE WITH THE FINAL VOWEL OF THE NOUN ROOT.

Plate 2.2 Vowel harmony in Turkish suffixes



Pilot questions 2.2

1. What term refers to the study of sound changes when morphemes combine?
2. Give one example of a morphophonemic alternation in English plurals.
3. How is the past tense morpheme realised after alveolar stops in English?
4. Which language uses vowel harmony to determine suffix pronunciation?
5. What phenomenon in French causes normally silent consonants to be pronounced before vowels?

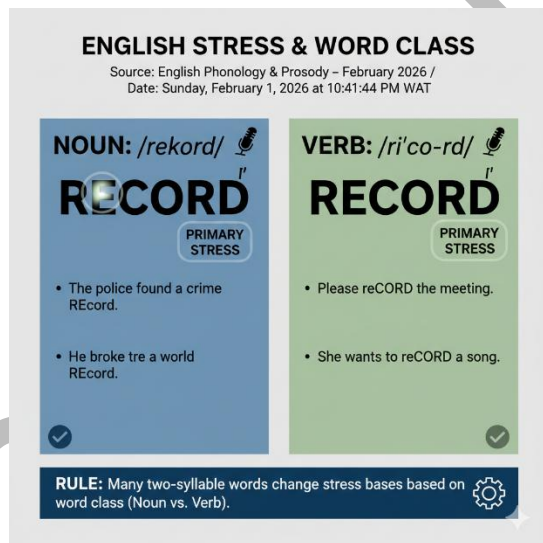
2.3 Prosodic Features and Sound Organisation

Prosody refers to the larger, suprasegmental aspects of speech that go beyond individual sounds. These features include stress, intonation, and rhythm, all of which play a crucial role in shaping how speech is organised and understood. In this Part, we will explore each of these features and examine how they interact with phonological systems.

2.3.1 Stress patterns

Stress is the relative emphasis placed on certain syllables within words or phrases. In English, stress can change meaning, as in the difference between ‘record’ (noun) and ‘record’ (verb). Stress patterns vary across languages, with some languages having fixed stress positions and others allowing variable stress.

Fill in the blank: In English, the word ‘record’ changes meaning depending on which _____ is stressed.



ENGLISH STRESS & WORD CLASS
Source: English Phonology & Prosody – February 2026 /
Date: Sunday, February 1, 2026 at 10:41:44 PM WAT

NOUN: /rekərd/	VERB: /rɪ'kɔːrd/
RECORD PRIMARY STRESS	RECORD PRIMARY STRESS
• The police found a crime REcord. • He broke the world REcord.	• Please reCORD the meeting. • She wants to reCORD a song.
RULE: Many two-syllable words change stress based on word class (Noun vs. Verb).	

Figure 2.3 Stress patterns in English

2.3.2 Intonation and rhythm



Intonation refers to the rise and fall of pitch in speech, which conveys meaning beyond words. For example, a rising intonation at the end of a sentence may indicate a question. **Rhythm** is the pattern of timing and accentuation in speech, often influenced by stress and syllable structure. English is considered a stress-timed language, while French is syllable-timed.

Fill in the blank: A rising intonation at the end of a sentence often signals a _____.

[Insert plate here] Image showing pitch contour of a question versus a statement in English. Caption: Plate 2.3 Intonation patterns in English AI prompt suggestion: “Generate an image showing pitch contour of a question versus a statement in English.” Search string: “intonation contour English question statement OER linguistics”

2.3.3 Interaction of prosody with phonological systems

Prosodic features interact with phonological systems to influence how sounds are organised. For example, stress placement can affect vowel reduction in English, where unstressed vowels often become [ə]. Intonation patterns can also determine the boundaries of phonological phrases, while rhythm influences how syllables are grouped.

These interactions show that prosody is not separate from phonology, but an integral part of how sound systems function.

Fill in the blank: In English, unstressed vowels often reduce to the sound _____.

Feature	Description	Examples	Phonological Effect
Vowel Reduction	Unstressed vowels often lose their distinct quality and become a "schwa" /ə/.	"Photograph"/[ˈfəʊtəˌɡræf] vs. "Photography"/[fəˈtɒɡrəfi]	Vowels in unstressed positions are centralized to save articulatory effort.
Phrase Boundaries	Pauses or pitch resets that signal the end of a thought or syntactic unit.	"After we ate**, ** the cat left." vs. "After we ate the cat**, ** we left."	Boundaries (indicated by commas) prevent ambiguity through timing and intonation.
Rhythm (Stress-Timing)	The tendency for stressed syllables to occur at regular intervals.	" DOGS CHASE CATS " (3 beats) vs. " The DOGS will be CHASing the CATS " (still roughly 3 beats).	Unstressed "function words" (the, will, be) are shortened to



Feature	Description	Examples	Phonological Effect
			maintain the rhythmic beat.

Table 2.3 Interaction of prosody with phonological systems

Pilot questions 2.3

1. What term refers to the relative emphasis placed on syllables in words?
2. Give one example of how stress changes meaning in English.
3. What does rising intonation at the end of a sentence usually indicate?
4. Which language is considered stress-timed, and which is syllable-timed?
5. What vowel sound often results from reduction in unstressed syllables in English?

2.4 Comparative Sound Systems

Phonological systems vary widely across languages, and comparing them helps us appreciate both their diversity and their underlying similarities. In this Part, we will examine case studies of selected languages, identify points of convergence and divergence, and reflect on the implications for phonological theory.

2.4.1 Case studies of selected languages

Each language has its own phonological system, shaped by its phonotactic rules, morphophonemic alternations, and prosodic features. For example, English allows complex consonant clusters, while Hawaiian restricts words to end in vowels. Yoruba demonstrates vowel harmony, and French exhibits liaison, where normally silent consonants are pronounced before vowels.

Fill in the blank: In French, _____ causes normally silent consonants to be pronounced before vowels.



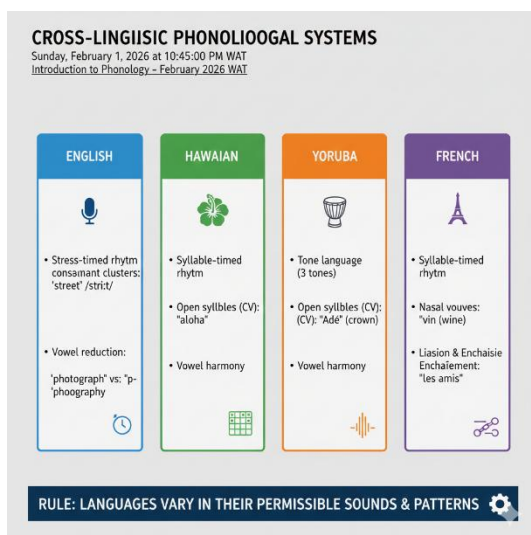


Plate 2.4 Case studies of selected phonological systems

2.4.2 Identifying similarities and differences

Comparing sound systems reveals both similarities and differences. For instance, many languages use vowel harmony, though the specific rules differ. Stress patterns vary, with English using variable stress and Finnish using fixed stress. Consonant clusters are common in Russian but rare in Japanese. These comparisons highlight the unique identity of each language while showing shared strategies for organising sounds.

Fill in the blank: In Finnish, stress is _____, while in English stress is variable.

Language	Stress Pattern	Consonant Clusters	Vowel Harmony
English	Lexical / Variable: Can fall on different syllables and distinguish meaning (e.g., <i>RE-cord</i> vs. <i>re-CORD</i>). Stress-timed rhythm.	Complex: Allows up to 3 consonants at the start (<i>str-</i>) and up to 4 at the end (<i>-mpst</i>).	None: Vowels do not need to agree; unstressed vowels simply reduce to schwa /ə/.
Finnish	Fixed (Initial): Primary stress is always on the first syllable of the word. Secondary stress falls on subsequent odd syllables.	Restricted: Native words traditionally avoid initial clusters. Modern loans (<i>strutsi</i>) are allowed but often simplified by speakers.	Strong (Front/Back): Vowels in a word must be either all front (<i>ä, ö, y</i>) or all back (<i>a, o, u</i>). /i/ and /e/ are neutral.
Russian	Lexical / Mobile: Stress can fall on any syllable	Complex: Permits dense clusters at the	None: However, the language has a strict



Language	Stress Pattern	Consonant Clusters	Vowel Harmony
	and often shifts during word inflection (e.g., <i>ruká</i> "hand" vs. <i>rúki</i> "hands").	beginning of words (e.g., <i>vstrecha</i> "meeting" starts with 4 consonants).	system of consonant "softness" (palatalization) influenced by following vowels.
Japanese	Pitch Accent: Uses high and low pitch instead of volume/intensity stress. The position of the "drop" in pitch distinguishes words.	Very Restricted: Syllable structure is typically (C)V. No clusters are allowed; they are "repaired" with vowels in loanwords (e.g., <i>strike</i> → <i>sutoraiki</i>).	None: Vowels are independent and do not undergo harmonic assimilation.

Table 2.4 Similarities and differences in phonological systems

2.4.3 Implications for phonological theory

Cross-linguistic comparison informs phonological theory by showing how universal principles interact with language-specific rules. For example, while all languages restrict sound combinations to some degree, the exact restrictions differ. These insights help linguists develop models that explain both the diversity and the commonalities of human language.

Fill in the blank: Cross-linguistic comparison helps linguists develop _____ that explain diversity and commonalities in language.

Core Concept	Theoretical Implication	Key Insight
Universality of Constraints	All languages draw from a finite set of cognitive and biological limitations.	Suggests that human speech is not random but governed by a Universal Grammar that prioritizes ease of articulation and clarity.
Diversity of Rules	Languages choose different "repair strategies" to satisfy universal constraints.	Proves the flexibility of human cognition , as different cultures develop unique phonological solutions (e.g., Turkish vowel harmony vs. English clusters).



Core Concept	Theoretical Implication	Key Insight
Language Identity	Phonological patterns are deeply internalized during early development.	Positions phonology as a social "shibboleth" ; these rules are the most resilient markers of a speaker's heritage and cultural belonging.

Box 2.1 Implications of comparative phonology

Pilot questions 2.4

1. What phenomenon in French causes silent consonants to be pronounced before vowels?
2. Which language has fixed stress, and which has variable stress?
3. Give one example of a language with complex consonant clusters.
4. What feature in Yoruba influences vowel co-occurrence?
5. How does cross-linguistic comparison contribute to phonological theory?

Series Summary

This Series has focused on analysing sound patterns and systems, building on the foundational knowledge gained earlier. Its purpose was to help you understand how phonological rules shape the organisation of sounds within and across languages, and why these rules are essential for describing the structure of spoken language.

We began by examining phonotactic rules and constraints, then moved on to morphophonemic alternations, exploring how morphemes interact with phonological environments. Following that, we studied prosodic features such as stress, intonation, and rhythm, and considered their role in sound organisation. Finally, we compared sound systems across selected languages, identifying similarities and differences and reflecting on their theoretical implications. By completing this Series, you should now be able to define and analyse phonotactic rules, describe and apply morphophonemic alternations, explain and evaluate prosodic features, and compare sound systems across languages, as outlined in the Series Learning Outcomes.

Glossary of Terms

Intonation: The rise and fall of pitch in speech, often used to signal meaning such as questions or statements.

Morphophonemics: The study of how sounds change when morphemes (the smallest meaningful units of language) combine in words.

Morpheme: The smallest meaningful unit of language, such as the plural suffix *-s* in English.



Phonotactics: The rules that govern which sound combinations are allowed or disallowed in a language.

Prosody: The suprasegmental features of speech, including stress, intonation, and rhythm, which shape how sounds are organised and understood.

Rhythm: The pattern of timing and accentuation in speech, influenced by stress and syllable structure.

Stress: The relative emphasis placed on certain syllables in words or phrases, which can change meaning.

Vowel harmony: A phonological process in which vowels within a word must share certain features, such as frontness or roundness, to maintain consistency.

Word-final consonant cluster: A group of consonants occurring at the end of a word, permitted in some languages (e.g., English) but restricted in others (e.g., Japanese).

Word stress pattern: The arrangement of stressed and unstressed syllables in a word, which may be fixed (as in Finnish) or variable (as in English).

Concept Check Questions [Series 2]

Objective questions

1. Which term refers to the rules that govern permissible sound combinations in a language? (Linked to SLO 2.1)
2. The English plural morpheme is realised as [s], [z], or _____ depending on the phonological environment. (Linked to SLO 2.3)
3. In Finnish, stress is _____, while in English stress is variable. (Linked to SLO 2.5)
4. Which suprasegmental feature refers to the rise and fall of pitch in speech? (Linked to SLO 2.5)
5. In Hawaiian, words typically end with _____, while Russian words often begin with complex consonant clusters. (Linked to SLO 2.7)

Short-answer questions

6. Define phonotactics and give one example from English. (Linked to SLO 2.1)
7. Explain what morphophonemic alternations are and provide one example from English past tense forms. (Linked to SLO 2.3)
8. Describe the difference between stress-timed and syllable-timed languages, giving one example of each. (Linked to SLO 2.5)
9. Identify one similarity and one difference between the phonological systems of English and Yoruba. (Linked to SLO 2.7)



Long-answer questions

10. Analyse the behaviour of the English plural morpheme, explaining how its pronunciation varies depending on the phonological environment. (Linked to SLO 2.3)
11. Evaluate the role of prosodic features such as stress, intonation, and rhythm in shaping phonological organisation. (Linked to SLO 2.6)
12. Compare the phonological systems of two languages of your choice, highlighting both similarities and differences, and discuss the implications for phonological theory. (Linked to SLO 2.7)

Answers to Concept Check Questions [Series 2]

Objective questions

1. Phonotactics.
2. [ɪz].
3. Fixed.
4. Intonation.
5. Vowels.

Short-answer questions

6. Phonotactics are the rules that govern permissible sound combinations in a language. Example: English permits /str/ at the beginning of words but not /tl/.
7. Morphophonemic alternations are sound changes that occur when morphemes combine. Example: the past tense morpheme is realised as [t] in 'walked', [d] in 'played', and [ɪd] in 'wanted'.
8. Stress-timed languages, such as English, have irregular syllable timing with stressed syllables occurring at regular intervals. Syllable-timed languages, such as French, give each syllable roughly equal timing.
9. Similarity: Both English and Yoruba restrict certain sound combinations. Difference: Yoruba uses vowel harmony, while English does not.

Long-answer questions

10. *Basic response:* The English plural morpheme varies as [s] after voiceless consonants (cats), [z] after voiced consonants (dogs), and [ɪz] after sibilants (horses). *Value-added response:* This variation illustrates assimilation, where the morpheme adapts to the voicing or sibilant quality of the preceding sound. It shows how phonological rules maintain ease of articulation and systematic organisation.
11. *Basic response:* Stress highlights syllables, intonation conveys meaning through pitch, and rhythm shapes timing. Together, they organise speech beyond individual sounds. *Value-added response:* Prosodic features also influence phonological processes such as vowel reduction, phrase boundaries, and speech rhythm. They contribute to language identity and can affect second-language acquisition, where learners must adapt to new prosodic systems.



12. *Basic response:* Comparing English and Japanese shows differences in consonant clusters (common in English, rare in Japanese) and similarities in vowel use. *Value-added response:* Such comparisons reveal universal principles, like restrictions on sound combinations, alongside language-specific rules. They inform phonological theory by demonstrating how languages balance ease of articulation with distinctiveness, and they highlight the diversity of strategies used to organise sound systems.

Answers to Pilot Questions [Series 2]

Part 2.1 Phonotactic Rules and Constraints

1. Phonotactics.
2. /str/.
3. Japanese.
4. Vowel harmony.
5. Vowels.

Part 2.2 Morphophonemic Alternations

1. Morphophonemics.
2. [z].
3. [ɪd].
4. Harmony.
5. Liaison.

Part 2.3 Prosodic Features and Sound Organisation

1. Stress.
2. 'Record' (noun) and 'record' (verb).
3. A question.
4. English is stress-timed; French is syllable-timed.
5. [ə].

Part 2.4 Comparative Sound Systems

1. Liaison.
2. Finnish has fixed stress; English has variable stress.
3. Russian.
4. Vowel harmony.
5. Models or theories.

References and Attributions [Series 2]

General References International Phonetic Association. (1999). *Handbook of the International Phonetic Association: A guide to the use of the International Phonetic Alphabet*. Cambridge University Press. Ladefoged, P., & Johnson, K. (2014). *A course in phonetics* (7th ed.). Cengage



Learning. Odden, D. (2005). *Introducing phonology*. Cambridge University Press. Spencer, A. (1996). *Phonology: Theory and description*. Blackwell.

Illustrations

- *Figure 2.1 Examples of phonotactic rules in English* AI-generated using prompt: “Create a diagram showing permitted consonant cluster /str/ and impermissible cluster /tl/ in English.” Suggested OER source: “phonotactic rules consonant clusters OER linguistics.”
- *Table 2.1 Examples of permissible and impermissible sound combinations* AI-generated using prompt: “Create a table comparing permissible and impermissible sound combinations in English, Japanese, and Yoruba.” Suggested OER source: “phonotactic constraints examples OER linguistics.”
- *Plate 2.1 Cross-linguistic phonotactic variation* AI-generated using prompt: “Generate an image showing Hawaiian words ending with vowels and Russian words beginning with consonant clusters.” Suggested OER source: “phonotactic variation Hawaiian Russian examples OER linguistics.”
- *Figure 2.2 Morphophonemic alternations in English plurals* AI-generated using prompt: “Create a diagram showing plural morpheme alternations [s], [z], [ɪz] with examples cats, dogs, horses.” Suggested OER source: “English plural morphophonemic alternations diagram OER linguistics.”
- *Table 2.2 Morphophonemic alternations in English* AI-generated using prompt: “Create a table showing plural and past tense morphophonemic alternations in English with examples.” Suggested OER source: “English morphophonemic alternations table OER linguistics.”
- *Plate 2.2 Vowel harmony in Turkish suffixes* AI-generated using prompt: “Generate an image showing Turkish plural suffix alternations -ler/-lar with examples.” Suggested OER source: “Turkish vowel harmony morphophonemics OER linguistics.”
- *Figure 2.3 Stress patterns in English* AI-generated using prompt: “Create a diagram showing stress placement in English words record (noun) and record (verb).” Suggested OER source: “English stress patterns diagram OER linguistics.”
- *Plate 2.3 Intonation patterns in English* AI-generated using prompt: “Generate an image showing pitch contour of a question versus a statement in English.” Suggested OER source: “intonation contour English question statement OER linguistics.”
- *Table 2.3 Interaction of prosody with phonological systems* AI-generated using prompt: “Create a table showing examples of vowel reduction, phrase boundaries, and rhythm effects in English.” Suggested OER source: “prosody phonological systems interaction OER linguistics.”
- *Plate 2.4 Case studies of selected phonological systems* AI-generated using prompt: “Generate an image showing examples of phonological features in English, Hawaiian, Yoruba, and French.” Suggested OER source: “phonological systems case studies English Hawaiian Yoruba French OER linguistics.”



- *Table 2.4 Similarities and differences in phonological systems* AI-generated using prompt: “Create a table comparing stress, consonant clusters, and vowel harmony across English, Finnish, Russian, and Japanese.” Suggested OER source: “phonological systems comparison English Finnish Russian Japanese OER linguistics.”
- *Box 2.1 Implications of comparative phonology* AI-generated using prompt: “Generate a box summarising theoretical implications of comparative phonology: universality, diversity, identity.” Suggested OER source: “comparative phonology theoretical implications OER linguistics.”

Course code: LIN 301

Course title: Phonology

Course credit load: 2 Units

Series 1: Foundations of Phonological Knowledge

Series 2: Analyzing Sound Patterns and Systems

Series 3: Principles and Methodologies of Phonological Analysis

Series 4: Conceptual Frameworks in Phonology

Series 5: Applied Phonological Discovery and Production

Proposed Outline for Series 3

Part .1 Foundations of Phonological Analysis

- 3.1.1 Definition and scope of phonological analysis
- 3.1.2 Key principles guiding phonological inquiry
- 3.1.3 Importance of systematic observation and transcription

Part .2 Methodologies in Phonological Research

- 3.2.1 Data collection techniques (elicitation, corpora, fieldwork)
- 3.2.2 Analytical tools (IPA, distinctive features, minimal pairs)
- 3.2.3 Hypothesis testing and rule formulation

Part .3 Approaches to Phonological Theory

- 3.3.1 Structuralist approaches
- 3.3.2 Generative phonology
- 3.3.3 Contemporary frameworks (e.g., Optimality Theory)

Part .4 Applications of Phonological Analysis

- 3.4.1 Language teaching and learning
- 3.4.2 Speech technology and computational phonology



- 3.4.3 Clinical and applied contexts (speech therapy, language documentation)

Introduction

In the last Series, we examined how sound patterns and systems operate across languages, focusing on phonotactic rules, morphophonemic alternations, prosodic features, and comparative sound systems. Having established this foundation, we now turn to the principles and methodologies that guide phonological analysis. This Series is important because it equips you with the tools and approaches needed to study phonology in a systematic and professional way, preparing you to engage with both theoretical and applied contexts.

The aim of this Series is to introduce you to the guiding principles of phonological analysis and to familiarise you with the methodologies used in phonological research. By the end, you should be able to apply these principles and methods to real linguistic data, evaluate different theoretical approaches, and appreciate the practical applications of phonological analysis.

We shall commence this Series by exploring the foundations of phonological analysis, including its scope, principles, and the importance of systematic observation. Next, we will move on to methodologies in phonological research, considering data collection techniques, analytical tools, and hypothesis testing. Following that, we will examine different approaches to phonological theory, ranging from structuralist traditions to contemporary frameworks such as Optimality Theory. Finally, we will wrap up by looking at applications of phonological analysis in language teaching, speech technology, and clinical contexts, bringing the Series to a close with a clear view of how phonological analysis connects theory with practice.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 3.1** define the scope and principles of phonological analysis,
- **SLO 3.2** explain the importance of systematic observation and transcription in phonological inquiry,
- **SLO 3.3** demonstrate methods of data collection for phonological research, including elicitation and corpus use,
- **SLO 3.4** apply analytical tools such as the International Phonetic Alphabet, distinctive features, and minimal pairs to linguistic data,
- **SLO 3.5** analyse phonological data by formulating and testing hypotheses,
- **SLO 3.6** describe major theoretical approaches to phonology, including structuralist, generative, and contemporary frameworks,
- **SLO 3.7** evaluate the strengths and limitations of different phonological theories, and



- **SLO 3.8** apply principles of phonological analysis to practical contexts such as language teaching, speech technology, and clinical practice.

3.1 Foundations of Phonological Analysis

Phonological analysis is the systematic study of how sounds function within a language. It provides the tools and principles needed to observe, describe, and explain sound patterns. In this Part, we will define the scope of phonological analysis, outline the guiding principles, and highlight the importance of systematic observation and transcription.

3.1.1 Definition and scope of phonological analysis

Phonological analysis refers to the process of examining the sound system of a language to identify its rules, patterns, and structures. It goes beyond simply listing sounds, focusing instead on how they interact and form meaningful contrasts. The scope of phonological analysis includes identifying phonemes, describing their distribution, and explaining the rules that govern their behaviour.

Fill in the blank: Phonological analysis focuses on how sounds interact and form meaningful _____ within a language.

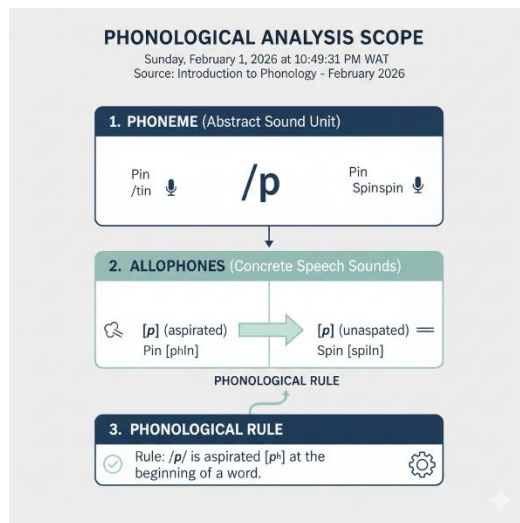


Figure 3.1 Scope of phonological analysis

3.1.2 Key principles guiding phonological inquiry

Phonological analysis is guided by several principles:

- **Systematicity:** Sound patterns are not random but follow rules.
- **Contrast:** Phonemes are identified by their ability to distinguish meaning.
- **Distribution:** Sounds occur in specific environments, and their placement is crucial.



- **Generalisability:** Observations should lead to rules that apply across contexts.

These principles ensure that phonological analysis is both rigorous and meaningful.

Fill in the blank: Phonemes are identified by their ability to _____ meaning in a language.

Core Principles of Phonological Analysis

Phonological analysis is the process of discovering the underlying logic of a language's sound system. It relies on four primary pillars to move from hearing a sound to understanding a rule.

| **Principle** | **Description** | **Linguistic Example** | | :--- | :--- | :--- | | **Systematicity** | The assumption that sounds follow organized, predictable patterns rather than occurring by chance. | **English Nasalization:** Vowels systematically become nasal when they come before a nasal consonant (e.g., *pan* [pæ̃n]). | | **Contrast** | The ability of two sounds to distinguish meaning. If swapping sounds changes the word, they are in contrast. | **Minimal Pairs:** *Tip* /tɪp/ vs. *Dip* /dɪp/ proves that voicing creates a meaningful contrast between /t/ and /d/. | | **Distribution** | The specific phonetic "neighborhoods" or positions where a sound is allowed to appear. | **The [h] sound:** In English, /h/ has a limited distribution; it can appear at the start of a syllable (*hat*) but never at the end. | | **Generalisability** | The tendency for rules to apply to **natural classes** (groups of sounds with shared features) rather than isolated sounds. | If we find a rule affecting /p/, we check if it also applies to /t/ and /k/, as they are all voiceless stops. |

Box 3.1 Principles of phonological analysis

3.1.3 Importance of systematic observation and transcription

Systematic observation involves carefully listening to and recording speech data, while **transcription** is the process of representing sounds using a consistent system such as the International Phonetic Alphabet (IPA). These practices are essential because they allow linguists to capture subtle differences in sound and ensure that analysis is based on accurate data.

Without transcription, it would be difficult to compare languages or to identify patterns that are not obvious in ordinary spelling. Observation and transcription therefore form the foundation of reliable phonological analysis.

Fill in the blank: Transcription uses a consistent system such as the _____ to represent speech sounds accurately.

Word	IPA Transcription	Key Sound Notes
Cat	/kæt/	The 'c' represents a voiceless velar stop /k/.



Word	IPA Transcription	Key Sound Notes
City	/ˈsɪti/	The 'c' represents a voiceless alveolar fricative /s/ (Soft C).
Thought	/θɔ:t/	'th' is a single sound (voiceless dental fricative /θ/); 'ough' is just one vowel.
The	/ðə/	'th' here is the voiced dental fricative /ð/, and the 'e' is a reduced schwa /ə/.
Rough	/rʌf/	'gh' is pronounced as the labiodental fricative /f/.
Though	/ðʊ/	'gh' is silent; the vowel is a diphthong /ʊ/.
Psychology	/saɪˈkɒlədʒi/	The 'p' is silent; 'ch' is pronounced /k/; 'y' functions as the vowel /i/.
Vision	/ˈvɪʒən/	The 's' represents the voiced postalveolar fricative /ʒ/.

Table 3.1 Examples of transcription using IPA

Pilot questions 3.1

1. What term refers to the process of examining the sound system of a language to identify its rules and patterns?
2. Which principle of phonological analysis states that sound patterns are not random but follow rules?
3. Phonemes are identified by their ability to do what in a language?
4. What system is commonly used for transcription in phonological analysis?
5. Why are observation and transcription considered essential in phonological analysis?

3.2 Methodologies in Phonological Research

Phonological research requires systematic methods to gather, analyse, and interpret data. In this Part, we will explore how linguists collect speech data, the analytical tools they use, and the processes of hypothesis testing and rule formulation. These methodologies ensure that phonological analysis is rigorous, replicable, and meaningful.

3.2.1 Data collection techniques

Data collection in phonology involves gathering speech samples for analysis. Common techniques include:



- **Elicitation:** Asking speakers to produce specific words or phrases to observe sound behaviour.
- **Corpora:** Using large collections of recorded or written texts to study sound patterns.
- **Fieldwork:** Collecting data directly from speakers of under-documented languages, often in natural settings.

Each technique has strengths and limitations, but together they provide a robust foundation for phonological research.

Fill in the blank: Collecting speech samples directly from speakers in natural settings is known as _____.



Plate 3.1 Data collection in phonological research

3.2.2 Analytical tools

Phonologists rely on several tools to interpret data:

- **International Phonetic Alphabet (IPA):** A standardised system for transcribing speech sounds.
- **Distinctive features:** Properties such as voicing, nasality, or place of articulation that distinguish phonemes.
- **Minimal pairs:** Pairs of words differing by a single sound, used to identify phonemes (e.g., *pat* vs *bat*).

These tools help linguists move from raw data to structured analysis.

Fill in the blank: The words *pat* and *bat* form a _____ pair because they differ by only one sound.



Tool	Definition	Role in Analysis	Example
IPA (International Phonetic Alphabet)	A standardized system of phonetic notation based on the Latin alphabet.	Provides a unique, unambiguous symbol for every distinct sound in human speech.	/ʃ/ represents the "sh" sound in <i>ship</i> , regardless of how it's spelled in different languages.
Distinctive Features	The most basic psychological and articulatory components of a sound (e.g., voicing, nasality).	Allows linguists to group sounds into natural classes and write generalized rules.	/b/ and /p/ share all features (bilabial, stop) except for [±voiced].
Minimal Pairs	A pair of words that differ by only one single sound in the same position.	The "gold standard" for proving that two sounds are distinct phonemes in a language.	<i>Fan</i> /fæn/ and <i>Van</i> /væn/ prove that /f/ and /v/ are separate phonemes in English.

Table 3.2 Analytical tools in phonology

3.2.3 Hypothesis testing and rule formulation

Phonological analysis often involves proposing hypotheses about sound behaviour and testing them against data. For example, a linguist might hypothesise that English plural morphemes vary depending on voicing. By examining multiple examples, the hypothesis can be confirmed or revised.

Rule formulation is the process of expressing these patterns as phonological rules. Rules describe how sounds change in specific environments, such as vowel reduction in unstressed syllables.

Fill in the blank: Expressing sound changes in specific environments is known as phonological _____ formulation.



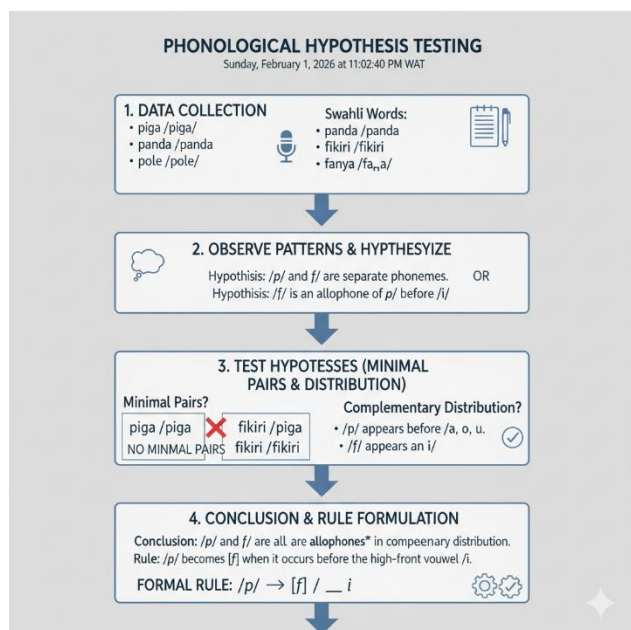


Figure 3.2 Hypothesis testing and rule formulation in phonology

Pilot questions 3.2

1. What term refers to collecting speech samples directly from speakers in natural settings?
2. Which system is used to transcribe speech sounds consistently across languages?
3. What do minimal pairs help linguists identify?
4. Give one example of a distinctive feature used in phonology.
5. What is the process of expressing sound changes in specific environments called?

3.3 Approaches to Phonological Theory

Phonological theory provides frameworks for explaining how sound systems are organised and how rules operate across languages. In this Part, we will explore major approaches, beginning with structuralist traditions, moving on to generative phonology, and concluding with contemporary frameworks such as Optimality Theory.

3.3.1 Structuralist approaches

Structuralist phonology emerged in the early 20th century and emphasised the systematic organisation of sounds within a language. It focused on identifying **phonemes** (the smallest units of sound that distinguish meaning) and describing their distribution. Structuralists relied heavily on minimal pairs and contrastive analysis to establish phonemic inventories.

Fill in the blank: Structuralist phonology emphasised identifying _____ as the smallest units of sound that distinguish meaning.



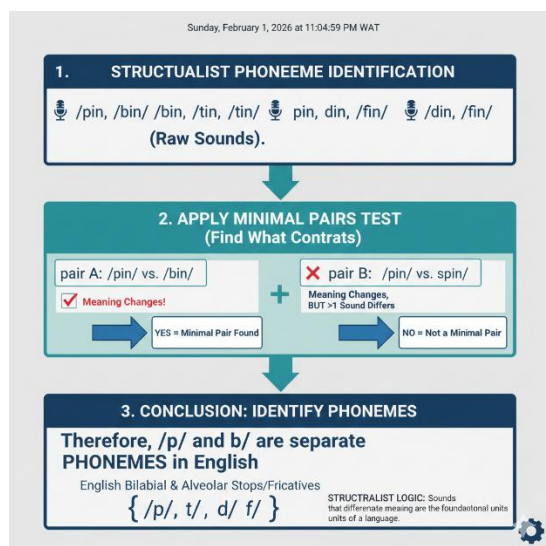


Figure 3.3 Structuralist phonology and phoneme identification

3.3.2 Generative phonology

Generative phonology, developed by Noam Chomsky and Morris Halle in the 1960s, introduced the idea that phonological rules transform underlying representations into surface forms. It emphasised the mental grammar of speakers and the systematic nature of sound alternations. Generative phonology allowed linguists to explain complex phenomena such as morphophonemic alternations and stress assignment.

Fill in the blank: Generative phonology explains how underlying representations are transformed into _____ forms by phonological rules.

Stage	Definition	Linguistic Role	Example (English Plural)
Underlying Representation (UR)	The abstract, mental form of a morpheme stored in the lexicon.	Represents the stable "identity" of a word before any changes occur. Enclosed in slashes / /.	/kæt + z/ (The mental intent to add the plural marker /z/ to <i>cat</i>).
Rule Application	The cognitive process where phonological rules act upon the UR.	"Repairs" the UR to fit the language's specific phonetic requirements.	Devoicing Rule: A voiced consonant becomes voiceless after a voiceless sound (\$z \rightarrow s\$ / [-voiced] _ _ \$).



Stage	Definition	Linguistic Role	Example (English Plural)
Surface Form (SF)	The actual phonetic realization that is physically articulated.	The final version of the word that listeners hear. Enclosed in brackets [].	[kæts] (The final spoken form where the /z/ has become [s]).

Table 3.3 Key features of generative phonology

3.3.3 Contemporary frameworks

Contemporary approaches, such as **Optimality Theory (OT)**, propose that phonological outputs are determined by competing constraints. Instead of rules, OT uses ranked constraints to explain why certain sound patterns are preferred over others. Other modern frameworks include usage-based phonology and prosodic phonology, which emphasise the role of frequency, rhythm, and larger prosodic structures.

Fill in the blank: Optimality Theory explains phonological outputs as the result of competing _____.

Framework	How it works	Practical Example
Optimality Theory (OT)	Operates like a competition . The brain has a list of "Candidates" (possible pronunciations) and filters them through "Constraints" (rules like <i>Don't use difficult sounds</i>).	Input: /ten/ in a language that hates nasal consonants. Candidates: [ten], [te], [tẽ]. Winner: [tẽ], because it keeps the vowel but avoids the nasal consonant.
Usage-Based Phonology	Operates like a muscle . The more you use a specific sound pattern, the stronger it gets. It emphasizes that	The "Hand" Rule: In the phrase <i>hand bag</i> , we often say [hæmbæg]. Usage-based theory



Framework	How it works	Practical Example
	speech is "messy" and changes over time through use.	says we do this because our brains "chunk" common phrases together to save energy.
Prosodic Phonology	Operates like an architect . It maps sounds onto a physical structure (the Syllable, the Foot, the Word). Sounds behave differently depending on where they "sit" in the building.	Aspiration: In English, /t/ is only "extra breathy" (\$[t^h]\$) if it sits at the start of a stressed syllable (<i>To-motto</i> vs. <i>To-ma-to</i>).

Box 3.2 Contemporary phonological frameworks

Pilot questions 3.3

1. Which approach emphasised identifying phonemes through minimal pairs and contrastive analysis?
2. Who developed generative phonology in the 1960s?
3. What term refers to the forms produced after phonological rules are applied to underlying representations?
4. Which contemporary framework explains phonological outputs using ranked constraints?
5. Name one other modern framework besides Optimality Theory.

3.4 Applications of Phonological Analysis

Phonological analysis is not only theoretical but also highly practical. Its principles and methods are applied in diverse fields such as language teaching, speech technology, and clinical practice. In this Part, we will explore how phonological knowledge is used beyond academic study to solve real-world problems.

3.4.1 Language teaching and learning

Phonological analysis plays a vital role in language teaching. Teachers use knowledge of **phonemes** and **prosody** to help learners improve pronunciation, distinguish minimal pairs, and acquire accurate stress and intonation patterns. This ensures learners can communicate clearly and effectively in a second language.

Fill in the blank: Teachers often use knowledge of _____ pairs to help learners distinguish between similar-sounding words.





Plate 3.2 Phonological analysis in language teaching

3.4.2 Speech technology and computational phonology

Phonological analysis is central to speech technology, including speech recognition and text-to-speech systems. These technologies rely on accurate models of sound patterns to convert spoken language into text or generate natural-sounding speech. Computational phonology also uses algorithms to analyse large corpora of speech data, improving applications such as voice assistants and translation tools.

Fill in the blank: Speech recognition systems rely on accurate models of _____ patterns to convert spoken language into text.



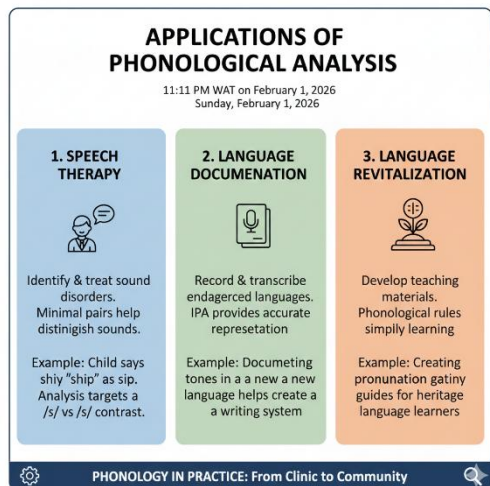
Figure 3.4 Phonological analysis in speech technology

3.4.3 Clinical and applied contexts



In clinical practice, phonological analysis supports speech therapy by identifying patterns of mispronunciation and designing interventions. For example, therapists may analyse a child's speech to determine which phonemes are problematic and create exercises to correct them. Phonological knowledge is also applied in language documentation, helping linguists preserve endangered languages by recording and analysing their sound systems.

Fill in the blank: In speech therapy, phonological analysis helps identify patterns of _____ in a child's speech.



Box 3.3 Applied uses of phonological analysis

Pilot questions 3.4

1. What tool do teachers often use to help learners distinguish between similar-sounding words?
2. Which technology relies on phonological models to convert spoken language into text?
3. How does phonological analysis support speech therapy?
4. Name one applied context where phonological analysis helps preserve linguistic heritage.
5. Why is phonological analysis important in language teaching?

Series Summary

This Series has focused on the principles and methodologies of phonological analysis, highlighting its importance for studying how sound systems are organised and applied in both theoretical and practical contexts. Its purpose was to equip you with the tools and approaches needed to observe, analyse, and interpret phonological data systematically, ensuring that your study of phonology is both rigorous and meaningful.

We began by examining the foundations of phonological analysis, including its scope, guiding principles, and the role of transcription. Then we explored methodologies in phonological research,



covering data collection techniques, analytical tools, and hypothesis testing. Following that, we studied major theoretical approaches, from structuralist traditions to generative phonology and contemporary frameworks such as Optimality Theory. Finally, we considered applications of phonological analysis in language teaching, speech technology, and clinical practice. By completing this Series, you should now be able to define and explain the principles of phonological analysis, demonstrate methods of data collection, apply analytical tools, analyse and evaluate theoretical approaches, and apply phonological knowledge in practical contexts, as outlined in the Series Learning Outcomes.

Glossary of Terms

Allophone: A variation of a phoneme that does not change meaning, often occurring in different sound environments.

Corpus: A large collection of spoken or written texts used as data for linguistic analysis.

Distinctive features: Basic sound properties such as voicing, nasality, or place of articulation that distinguish one phoneme from another.

Elicitation: A method of data collection where speakers are asked to produce specific words or phrases for analysis.

Fieldwork: The process of collecting linguistic data directly from speakers, often in natural or community settings.

Generative phonology: A theoretical approach that explains how underlying sound representations are transformed into surface forms by phonological rules.

International Phonetic Alphabet (IPA): A standardised system of symbols used to represent speech sounds consistently across languages.

Minimal pair: Two words that differ by only one sound, used to identify phonemes (e.g., *pat* vs *bat*).

Optimality Theory (OT): A contemporary framework in phonology that explains sound patterns as the result of competing ranked constraints rather than rules.

Phoneme: The smallest unit of sound in a language that can distinguish meaning.

Phonological analysis: The systematic study of a language's sound system, focusing on rules, patterns, and contrasts.

Rule formulation: The process of expressing observed sound changes as phonological rules that apply in specific environments.



Structuralist phonology: An early theoretical approach that emphasised identifying phonemes and describing their distribution using contrastive analysis.

Systematic observation: Careful listening and recording of speech data to ensure accurate analysis.

Transcription: The representation of speech sounds using a consistent system such as the IPA.

Usage-based phonology: A modern framework that emphasises the role of frequency and experience in shaping sound patterns.

Concept Check Questions [Series 3]

Objective questions

1. Which term refers to the smallest unit of sound that can distinguish meaning in a language? (Linked to SLO 3.1)
2. Collecting speech samples directly from speakers in natural settings is known as _____. (Linked to SLO 3.3)
3. The International Phonetic Alphabet (IPA) is used for what purpose in phonological analysis? (Linked to SLO 3.4)
4. Generative phonology explains how underlying representations are transformed into _____ forms. (Linked to SLO 3.6)
5. Optimality Theory accounts for phonological outputs by using ranked _____. (Linked to SLO 3.6)

Short-answer questions

6. Define phonological analysis and explain its scope. (Linked to SLO 3.1)
7. Give one example of a distinctive feature and explain its role in distinguishing phonemes. (Linked to SLO 3.4)
8. Describe how minimal pairs are used in phonological research. (Linked to SLO 3.4)
9. Identify one application of phonological analysis in language teaching. (Linked to SLO 3.8)
10. Explain why transcription is essential in phonological research. (Linked to SLO 3.2)

Long-answer questions

11. Analyse the role of systematic observation and transcription in phonological analysis. (Linked to SLO 3.2)
12. Evaluate the strengths and limitations of generative phonology compared to structuralist approaches. (Linked to SLO 3.7)
13. Discuss how phonological analysis contributes to speech technology and clinical practice, giving specific examples. (Linked to SLO 3.8)



Objective questions

1. Phoneme.
2. Fieldwork.
3. Consistent transcription of speech sounds across languages.
4. Surface forms.
5. Constraints.

Short-answer questions

6. Phonological analysis is the systematic study of a language's sound system, focusing on rules, patterns, and contrasts. Its scope includes identifying phonemes, describing their distribution, and explaining sound behaviour.
7. Example: Voicing. It distinguishes sounds such as /p/ (voiceless) and /b/ (voiced).
8. Minimal pairs are pairs of words differing by one sound (e.g., *pat* vs *bat*) and are used to identify phonemes.
9. Teachers use phonological analysis to teach pronunciation, for example by helping learners distinguish minimal pairs.
10. Transcription ensures accurate representation of speech sounds, allowing linguists to capture subtle differences and compare languages reliably.

Long-answer questions

11. *Basic response:* Systematic observation involves careful listening and recording of speech, while transcription represents sounds using a consistent system such as the IPA. Together, they ensure accurate data for analysis. *Value-added response:* Beyond accuracy, observation and transcription allow cross-linguistic comparison, support language documentation, and provide a foundation for computational models of speech. They also help identify subtle phonetic variations that may influence phonological rules.
12. *Basic response:* Generative phonology explains sound alternations through rules applied to underlying forms, while structuralist approaches focus on identifying phonemes through contrastive analysis. *Value-added response:* Generative phonology offers deeper explanatory power for complex alternations, but it can be abstract and less accessible. Structuralist approaches are simpler and data-driven, yet limited in explaining transformations. Evaluating both highlights the balance between descriptive clarity and theoretical depth.
13. *Basic response:* Phonological analysis supports speech technology by modelling sound patterns for recognition and synthesis, and aids clinical practice by identifying mispronunciations in speech therapy. *Value-added response:* In speech technology, phonological rules improve naturalness in text-to-speech systems and accuracy in recognition software. In clinical contexts, phonological analysis informs targeted interventions for speech disorders and contributes to preserving endangered languages through documentation.



Part 3.1 Foundations of Phonological Analysis

1. Contrasts.
2. Phonemes.
3. Distinguish.
4. International Phonetic Alphabet (IPA).
5. Because they ensure accurate representation of speech sounds for reliable analysis.

Part 3.2 Methodologies in Phonological Research

1. Fieldwork.
2. International Phonetic Alphabet (IPA).
3. Phonemes.
4. Voicing (or another distinctive feature such as nasality or place of articulation).
5. Rule formulation.

Part 3.3 Approaches to Phonological Theory

1. Structuralist approaches.
2. Noam Chomsky and Morris Halle.
3. Surface forms.
4. Optimality Theory.
5. Usage-based phonology or prosodic phonology.

Part 3.4 Applications of Phonological Analysis

1. Minimal pairs.
2. Speech recognition.
3. By identifying mispronunciation patterns and designing corrective interventions.
4. Language documentation and preservation of endangered languages.
5. Because it helps learners acquire accurate pronunciation, stress, and intonation patterns.

References and Attributions [Series 3]

General References Chomsky, N., & Halle, M. (1968). *The sound pattern of English*. Harper & Row. International Phonetic Association. (1999). *Handbook of the International Phonetic Association: A guide to the use of the International Phonetic Alphabet*. Cambridge University Press. Ladefoged, P., & Johnson, K. (2014). *A course in phonetics* (7th ed.). Cengage Learning. Odden, D. (2005). *Introducing phonology*. Cambridge University Press. Spencer, A. (1996). *Phonology: Theory and description*. Blackwell.

Illustrations

- *Figure 3.1 Scope of phonological analysis* AI-generated using prompt: “Create a diagram showing phonemes, allophones, and phonological rules with examples.” Suggested OER source: “phonological analysis scope diagram OER linguistics.”



- *Box 3.1 Principles of phonological analysis* AI-generated using prompt: “Generate a box summarising key principles of phonological analysis with examples.” Suggested OER source: “principles of phonological analysis OER linguistics.”
- *Table 3.1 Examples of transcription using IPA* AI-generated using prompt: “Create a table showing English words with spelling, IPA transcription, and notes on sound differences.” Suggested OER source: “IPA transcription examples English OER linguistics.”
- *Plate 3.1 Data collection in phonological research* AI-generated using prompt: “Generate an image showing a linguist recording speech data from native speakers in a fieldwork setting.” Suggested OER source: “phonology fieldwork data collection OER linguistics.”
- *Table 3.2 Analytical tools in phonology* AI-generated using prompt: “Create a table summarising IPA, distinctive features, and minimal pairs with examples.” Suggested OER source: “phonology analytical tools IPA minimal pairs OER linguistics.”
- *Figure 3.2 Hypothesis testing and rule formulation in phonology* AI-generated using prompt: “Create a diagram showing hypothesis testing leading to phonological rule formulation with examples.” Suggested OER source: “phonology hypothesis testing rule formulation diagram OER linguistics.”
- *Figure 3.3 Structuralist phonology and phoneme identification* AI-generated using prompt: “Create a diagram showing minimal pairs used to identify phonemes in structuralist phonology.” Suggested OER source: “structuralist phonology phoneme identification OER linguistics.”
- *Table 3.3 Key features of generative phonology* AI-generated using prompt: “Create a table summarising underlying representation, rule application, and surface form in generative phonology.” Suggested OER source: “generative phonology rules underlying surface forms OER linguistics.”
- *Box 3.2 Contemporary phonological frameworks* AI-generated using prompt: “Generate a box summarising Optimality Theory, usage-based phonology, and prosodic phonology with examples.” Suggested OER source: “Optimality Theory phonology frameworks OER linguistics.”
- *Plate 3.2 Phonological analysis in language teaching* AI-generated using prompt: “Generate an image showing a teacher guiding students through pronunciation exercises using minimal pairs.” Suggested OER source: “phonology language teaching pronunciation minimal pairs OER linguistics.”
- *Figure 3.4 Phonological analysis in speech technology* AI-generated using prompt: “Create a diagram showing phonological rules integrated into speech recognition systems.” Suggested OER source: “phonology speech recognition diagram OER linguistics.”
- *Box 3.3 Applied uses of phonological analysis* AI-generated using prompt: “Generate a box summarising applications of phonological analysis in speech therapy and language



documentation.” Suggested OER source: “phonology speech therapy language documentation OER linguistics.”

Course code: LIN 301

Course title: Phonology

Course credit load: 2 Units

Series 1: Foundations of Phonological Knowledge

Series 2: Analyzing Sound Patterns and Systems

Series 3: Principles and Methodologies of Phonological Analysis

Series 4: Conceptual Frameworks in Phonology

Series 5: Applied Phonological Discovery and Production

Proposed Outline for Series 4

Part .1 Classical frameworks in phonology

- 4.1.1 Structuralist phonology
- 4.1.2 Prague School contributions (distinctive features, markedness)
- 4.1.3 Early functionalist perspectives

Part .2 Generative frameworks

- 4.2.1 The Sound Pattern of English (Chomsky & Halle)
- 4.2.2 Rule-based phonology
- 4.2.3 Lexical phonology and prosodic hierarchy

Part .3 Contemporary frameworks

- 4.3.1 Optimality Theory (constraints and ranking)
- 4.3.2 Usage-based phonology
- 4.3.3 Prosodic and autosegmental phonology

Part .4 Applications and critiques of frameworks

- 4.4.1 Strengths and limitations of each framework
- 4.4.2 Cross-linguistic applications
- 4.4.3 Current debates and future directions



Introduction

In the last Series, we examined the principles and methodologies of phonological analysis, focusing on how data is collected, analysed, and applied in both theoretical and practical contexts. Building on that foundation, this Series turns to the conceptual frameworks that underpin phonological theory. Understanding these frameworks is essential because they provide the lenses through which linguists interpret sound systems, explain patterns, and debate the nature of phonological rules.

The aim of this Series is to introduce you to the major frameworks in phonology, both classical and contemporary, and to equip you with the ability to evaluate their strengths, limitations, and applications. By the end, you should be able to connect theoretical perspectives with practical analysis and appreciate how different frameworks shape our understanding of language.

We shall commence this Series by exploring classical frameworks in phonology, including structuralist traditions and contributions from the Prague School. Next, we will move on to generative frameworks, examining rule-based phonology and developments such as lexical phonology. Following that, we will consider contemporary frameworks, including Optimality Theory, usage-based approaches, and prosodic phonology. Finally, we will wrap up by discussing applications and critiques of these frameworks, highlighting their relevance across languages and their role in current debates, thereby rounding off the Series with a clear view of how conceptual frameworks continue to shape phonological inquiry.

4.1 Classical Frameworks in Phonology

Classical frameworks in phonology laid the foundation for modern theoretical approaches. They emphasised the systematic organisation of sounds, the identification of phonemes, and the functional role of sound contrasts in communication. In this Part, we will explore structuralist phonology, the contributions of the Prague School, and early functionalist perspectives.

4.1.1 Structuralist phonology

Structuralist phonology refers to an early theoretical approach that focused on identifying **phonemes** (the smallest units of sound that distinguish meaning) and describing their distribution in a language. Structuralists relied heavily on **minimal pairs**, such as *pat* and *bat*, to establish phonemic inventories. Their work highlighted the importance of contrast and distribution in understanding sound systems.

Fill in the blank: Structuralist phonology identifies phonemes by examining _____ pairs that differ by a single sound.



Structuralist Phonology: Identifying Phonemes with Minimal Pairs

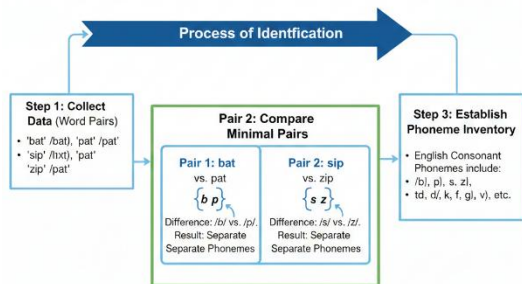


Figure 4.1 Structuralist phonology and phoneme identification

4.1.2 Prague School contributions

The **Prague School** was a group of linguists in the early 20th century who advanced phonological theory by introducing concepts such as **distinctive features** and **markedness**. Distinctive features are basic sound properties (e.g., voicing, nasality, place of articulation) that distinguish phonemes. Markedness refers to the relative simplicity or complexity of sounds, with unmarked sounds being more common and easier to produce.

These contributions helped linguists move beyond listing phonemes to analysing the deeper properties that define them.

Fill in the blank: The Prague School introduced the concept of _____ features to explain how phonemes differ.



**Prague School Phonology:
Distinctive Features & Markedness**

Feature	Unmarked Value (Common)	Marked Value (Less Common)
Voicing	✓ -voice (e./p, t, k/	+voice (e./b, d, g) ✕
Nasal	✓ -nasal (e./b, d, g)	+nasal ✕
Continuant	✓ -continuant	+m, t, n/ ✕
Stops	✓ -continuant (e./p, t, k)	f, s, ʃ/ ✕
	✓ Oral Stops (e./p, t, k)	Nasal Stops (m, n, ŋ)
Vowels	✓ Oral Vowels (e./i, u, a)	Nasalized Vowes /ĩ, </

Unmarked features are considered the "default" or more natural state, occurring more frequently across languages.

Table 4.1 Contributions of the Prague School

4.1.3 Early functionalist perspectives

Functionalist phonology emphasised the communicative role of sounds. It argued that phonological systems are shaped by their function in distinguishing meaning and maintaining clarity in communication. Functionalists highlighted the balance between ease of articulation and perceptual distinctiveness, showing how languages optimise sound systems for effective communication.

Fill in the blank: Functionalist phonology emphasises the role of sounds in maintaining _____ in communication.

Force	Driven by...	Effect on Language
Articulatory Ease	The Speaker	Sounds merge, simplify, or disappear (e.g., "gonna" for "going to").
Perceptual Clarity	The Listener	Sounds stay distinct or become more "intense" to ensure they are heard.

Box 4.1 Functionalist perspectives in phonology

Pilot questions 4.1

1. What approach focused on identifying phonemes through minimal pairs and distribution?
2. Which group of linguists introduced distinctive features and markedness?



3. What are distinctive features in phonology?
4. What does markedness refer to in phonological theory?
5. What is the main emphasis of functionalist phonology?

4.2 Generative Frameworks

Generative frameworks marked a major shift in phonological theory, introducing the idea that sound systems are part of a speaker's mental grammar. These approaches emphasise rules that transform underlying representations into surface forms, allowing linguists to explain complex alternations and patterns. In this Part, we will explore *The Sound Pattern of English*, rule-based phonology, and developments such as lexical phonology and the prosodic hierarchy.

4.2.1 The Sound Pattern of English (Chomsky & Halle)

The Sound Pattern of English (SPE), published in 1968 by Noam Chomsky and Morris Halle, is a landmark work in generative phonology. It introduced the idea that phonological rules operate on **underlying representations** (abstract forms stored in the mind) to produce **surface forms** (the actual sounds we hear). This framework allowed linguists to explain morphophonemic alternations, stress assignment, and other complex phenomena.

Fill in the blank: In SPE, phonological rules transform underlying representations into _____ forms.

Stage	Level	Notation	Example (Pluralization)
Input	Underlying Representation	// (Slashes)	/kæt + z/
Process	Phonological Rules	\$A → B\$	Devocalization rule: \$/z/ → [s]\$ after voiceless stops.
Output	Surface Form	[] (Brackets)	[kæts]

Figure 4.2 Generative phonology in SPE

4.2.2 Rule-based phonology

Rule-based phonology emphasises the systematic application of rules to explain sound alternations. For example, English plural morphemes vary depending on voicing: /s/ after voiceless sounds (*cats*), /z/ after voiced sounds (*dogs*), and /ɪz/ after sibilants (*horses*). Such rules demonstrate how phonology interacts with morphology and syntax.

Fill in the blank: English plural morphemes vary depending on whether the preceding sound is _____ or voiceless.



Surface Form (SF)	Phonetic Environment	Example	Phonological Rule
[s]	After a voiceless non-sibilant consonant (e.g., /p, t, k, f, θ/)	Cats (/kæt/ + /z/ → [kæts])	Devoicing: The /z/ loses its voice to match the preceding voiceless sound.
[z]	After a voiced non-sibilant (e.g., /b, d, g, m, n, l/) or any vowel	Dogs (/dɒg/ + /z/ → [dɒgz])	Identity: No rule applies; the surface form matches the underlying representation.
[əz]	After a sibilant (hissing/hushing) sound (e.g., /s, z, ʃ, ʒ, tʃ, dʒ/)	Horses (/hɔ:rs/ + /z/ → [hɔ:rsəz])	Epenthesis: A schwa [ə] is inserted to prevent two similar sounds from crashing together.

Table 4.2 Examples of rule-based phonology

4.2.3 Lexical phonology and prosodic hierarchy

Lexical phonology integrates phonological rules with the lexicon, showing how rules apply at different levels of word formation. It explains why some rules apply within words while others apply across word boundaries.

The **prosodic hierarchy** is a framework that organises phonological units into levels such as syllable, foot, prosodic word, and intonational phrase. It highlights the role of rhythm and stress patterns in shaping phonological systems.

Fill in the blank: The prosodic hierarchy organises phonological units into levels such as syllable, foot, and _____ phrase.

Concept	Primary Focus	Key Question
Lexical Phonology	Word Construction	How do suffixes change the sound of the root word?
Prosodic Hierarchy	Rhythmic Structure	How are sounds grouped into beats and phrases for timing?

Box 4.2 Lexical phonology and prosodic hierarchy

Pilot questions 4.2

1. Who authored *The Sound Pattern of English*?
2. What term refers to the abstract forms stored in the mind that phonological rules operate on?



3. Give one example of a rule-based alternation in English plurals.
4. What framework integrates phonological rules with the lexicon?
5. Name one level in the prosodic hierarchy.

4.3 Contemporary Frameworks

Contemporary frameworks in phonology represent a shift from rule-based approaches to models that emphasise constraints, usage, and prosodic organisation. These frameworks aim to explain why certain sound patterns are preferred and how phonological systems adapt to communicative needs. In this Part, we will explore Optimality Theory, usage-based phonology, and prosodic and autosegmental phonology.

4.3.1 Optimality Theory (constraints and ranking)

Optimality Theory (OT) is a framework that explains phonological outputs as the result of competing **constraints**. Constraints are rules that govern sound patterns, but they are ranked rather than absolute. The optimal output is the one that best satisfies the hierarchy of constraints. For example, a language may prioritise ease of articulation over faithfulness to the input form.

Fill in the blank: In Optimality Theory, phonological outputs are determined by the ranking of competing _____.

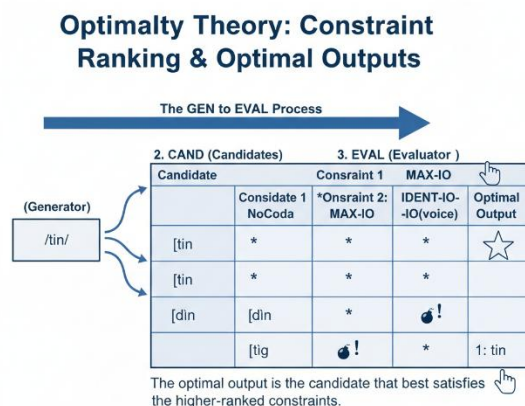


Figure 4.3 Optimality Theory and constraint ranking

4.3.2 Usage-based phonology

Usage-based phonology emphasises the role of frequency and experience in shaping sound systems. It argues that phonological patterns emerge from repeated use and are influenced by cognitive processes such as analogy and memory. This framework highlights how speakers adapt their sound systems based on communicative needs and exposure.

Fill in the blank: Usage-based phonology argues that phonological patterns emerge from repeated _____ and cognitive processes.



Type of Frequency	Effect on Phonology	Example
Token Frequency	Individual words used often become shorter/simpler.	"Don't know" becomes "dunno."
Type Frequency	A pattern used in many different words becomes the "default."	The plural -s in English being applied to new words (e.g., "googled").

Box 4.3 Usage-based phonology

4.3.3 Prosodic and autosegmental phonology

Prosodic phonology focuses on the organisation of sounds into larger rhythmic units such as syllables, feet, and intonational phrases. It explains how stress and rhythm shape phonological systems.

Autosegmental phonology introduces the idea that certain features, such as tone, operate on separate tiers independent of segmental phonemes. This framework is particularly useful for analysing tonal languages, where pitch patterns carry meaning.

Fill in the blank: Autosegmental phonology explains how features such as _____ operate on separate tiers independent of segments.

Framework	Level / Tier	Definition	Example
Prosodic Hierarchy	Utterance (\$\epsilon\$)	The largest phonological unit; a complete thought.	"Is the tea hot?"
	Intonational Phrase (\$IP\$)	A unit defined by a single pitch contour or melody.	[The tea] (pause) [is hot].
	Phonological Phrase (\$\phi\$)	Groups words together, often a Head + Modifier.	"The hot tea"
	Prosodic Word (\$\omega\$)	A lexical word plus any attached grammatical "clitics."	"The-tea"
	Foot (\$F\$)	Rhythmic units of stressed and unstressed syllables.	Teapot (Stressed-unstressed)
	Syllable (\$\sigma\$)	The basic unit of speech timing.	tea



Framework	Level / Tier	Definition	Example
Autosegmental Tiers	Tone Tier	The "track" where pitch (H/L) is stored separately.	In Mandarin, the tone /˥/ on <i>mā</i> .
	CV Tier (Skeletal)	The timing slots for consonants and vowels.	A long vowel taking up two 'V' slots.
	Segmental Tier	The specific phonetic features (e.g., [nasal]).	The /n/ in <i>man</i> .

Table 4.3 Prosodic and autosegmental phonology

Pilot questions 4.3

1. What framework explains phonological outputs as the result of competing ranked constraints?
2. What does usage-based phonology emphasise in shaping sound systems?
3. Which framework focuses on organising sounds into rhythmic units such as syllables and feet?
4. What does autosegmental phonology propose about features like tone?
5. Give one example of how frequency influences phonological patterns.

4.4 Applications and Critiques of Frameworks

Phonological frameworks are not only theoretical constructs but also tools that shape practical analysis and cross-linguistic research. By applying these frameworks, linguists can explain sound systems across diverse languages, while critiques highlight their limitations and encourage refinement. In this Part, we will examine the strengths and weaknesses of different frameworks, explore their applications in various linguistic contexts, and consider current debates and future directions.

4.4.1 Strengths and limitations of each framework

Every phonological framework offers unique insights but also faces challenges. **Structuralist phonology** provided clarity in identifying phonemes but struggled to explain alternations. **Generative phonology** introduced powerful rule-based explanations but was criticised for being overly abstract. **Optimality Theory** offered flexibility through constraint ranking but raised questions about universality and learnability. Usage-based and prosodic approaches highlighted real-world communicative functions but sometimes lacked formal precision.

Fill in the blank: Generative phonology was criticised for being overly _____ in its explanations of sound systems.



Framework	Core Philosophy	Major Strengths	Limitations
Structuralist (e.g., Prague School, Bloomfield)	Focuses on the distribution of sounds and identifying phonemes through contrast.	Excellent for documenting new languages; established the concept of the phoneme.	Often ignores the "mental" process; struggles to explain <i>why</i> sound changes happen.
Generative (e.g., SPE, Rule-based)	Views phonology as a mental process of rules transforming underlying forms to surface speech.	Explains the relationship between related words (e.g., <i>electric</i> / <i>electricity</i>); highly systematic.	Rules can become overly complex ("rule madness"); doesn't always reflect how humans actually learn.
Contemporary (e.g., OT, Usage-based)	Focuses on constraints (Optimality Theory) or experience (Usage-based/Exemplar).	OT handles language universals well; Usage-based models capture how frequency affects speech.	OT can be computationally difficult; Usage-based models require massive amounts of data to prove.

Table 4.4 Strengths and limitations of phonological frameworks

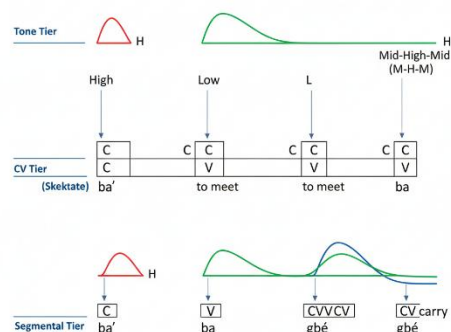
4.4.2 Cross-linguistic applications

Phonological frameworks are applied across languages to explain diverse sound systems. For example, autosegmental phonology is particularly effective in analysing tonal languages such as Yoruba or Mandarin, while prosodic phonology helps explain stress and rhythm in English and French. These applications demonstrate the adaptability of frameworks to different linguistic contexts.

Fill in the blank: Autosegmental phonology is especially useful for analysing _____ languages where pitch patterns carry meaning.



Left-to-right association and spread
Autosegmental Tiers: Tonal Patterns in Yoru'bà
 Tone is independent of segments



The tonal melody is separate and 'floats' above the consonants and vowels, associating as needed.

Plate 4.4 Cross-linguistic application of autosegmental phonology

4.4.3 Current debates and future directions

Contemporary debates in phonology focus on the balance between formal precision and functional explanation. Some scholars argue for the continued relevance of rule-based approaches, while others emphasise constraint-based or usage-based models. Future directions include integrating phonological theory with advances in computational linguistics, psycholinguistics, and language acquisition research.

Fill in the blank: Current debates in phonology often focus on the balance between formal precision and _____ explanation.

Feature	Rule-Based (The Past)	Constraint-Based (The Present)	Computational/Usage-Based (The Future)
Logic	Procedural (Step 1, Step 2)	Evaluative (Best Fit)	Statistical (Most Frequent)
Data Source	Native Speaker Intuition	Language Universals	Big Data / Corpora
Key Goal	Simplicity of the Rule	Satisfaction of Constraints	Predictive Accuracy

Box 4.4 Current debates and future directions in phonology

Pilot questions 4.4

1. What was one criticism of generative phonology?
2. Which framework is especially useful for analysing tonal languages?
3. Give one example of how prosodic phonology applies to stress and rhythm.
4. What is a key focus of current debates in phonology?



5. Name one area where phonological theory is expected to integrate in the future.

Series Summary

This Series has focused on conceptual frameworks in phonology, highlighting their importance in shaping how linguists interpret sound systems and explain phonological patterns. Its purpose was to provide you with a clear understanding of the major theoretical traditions, from classical approaches to contemporary models, and to show how these frameworks contribute to both analysis and application.

We began with classical frameworks, including structuralist phonology, the Prague School's contributions, and functionalist perspectives. Then we moved on to generative frameworks, examining *The Sound Pattern of English*, rule-based phonology, and developments such as lexical phonology and the prosodic hierarchy. Following that, we explored contemporary frameworks, including Optimality Theory, usage-based phonology, and autosegmental approaches. Finally, we considered applications and critiques, looking at strengths and limitations, cross-linguistic uses, and current debates. By completing this Series, you should now be able to define and explain classical and generative frameworks, analyse contemporary approaches, evaluate their strengths and weaknesses, and apply them to practical and cross-linguistic contexts, as outlined in the Series Learning Outcomes.

Glossary of Terms

Autosegmental phonology: A framework that explains how certain features, such as tone, operate on separate tiers independent of segmental sounds.

Constraint: In Optimality Theory, a ranked condition that governs sound patterns and determines which outputs are preferred.

Distinctive features: Basic sound properties, such as voicing or nasality, that distinguish one phoneme from another.

Functionalist phonology: An approach that emphasises the communicative role of sounds, focusing on clarity and ease of articulation.

Generative phonology: A framework that explains how underlying representations are transformed into surface forms by phonological rules.

Lexical phonology: A model that integrates phonological rules with the lexicon, showing how rules apply at different stages of word formation.

Markedness: A concept from the Prague School that refers to the relative simplicity or complexity of sounds, with unmarked sounds being more common and easier to produce.

Minimal pair: Two words that differ by only one sound, used to identify phonemes (e.g., *pat* vs *bat*).

Optimality Theory (OT): A contemporary framework in phonology that explains outputs as the result of competing ranked constraints.

Phoneme: The smallest unit of sound in a language that can distinguish meaning.



Prosodic hierarchy: A framework that organises phonological units into levels such as syllable, foot, prosodic word, and intonational phrase.

Structuralist phonology: An early theoretical approach that focused on identifying phonemes and describing their distribution using contrastive analysis.

Surface form: The actual sound produced in speech after phonological rules have been applied to the underlying representation.

The Sound Pattern of English (SPE): A landmark work by Chomsky and Halle (1968) that introduced generative phonology and the idea of rules transforming underlying representations into surface forms.

Underlying representation: The abstract mental form of a word or morpheme before phonological rules are applied.

Usage-based phonology: A framework that emphasises the role of frequency and repeated use in shaping phonological patterns.

Concept Check Questions [Series 4]

Objective questions

1. Which framework introduced the concepts of distinctive features and markedness? (Linked to SLO 4.1)
2. In *The Sound Pattern of English*, phonological rules transform underlying representations into _____ forms. (Linked to SLO 4.3)
3. Which framework explains phonological outputs as the result of competing ranked constraints? (Linked to SLO 4.6)
4. Autosegmental phonology is especially useful for analysing _____ languages. (Linked to SLO 4.6)
5. Generative phonology was criticised for being overly _____ in its explanations. (Linked to SLO 4.7)

Short-answer questions

6. Define a phoneme and explain its role in structuralist phonology. (Linked to SLO 4.1)
7. Describe one example of a rule-based alternation in English plurals. (Linked to SLO 4.4)
8. Explain the concept of markedness as introduced by the Prague School. (Linked to SLO 4.2)
9. What does usage-based phonology emphasise in shaping sound systems? (Linked to SLO 4.6)
10. Identify one area where phonological theory is expected to integrate in the future. (Linked to SLO 4.8)

Long-answer questions



11. Analyse the contributions of the Prague School to phonological theory. (Linked to SLO 4.2)
12. Evaluate the strengths and limitations of Optimality Theory compared to rule-based phonology. (Linked to SLO 4.7)
13. Discuss how phonological frameworks are applied cross-linguistically, giving specific examples. (Linked to SLO 4.8)

[Answers to Concept Check Questions \[Series 4\]](#)

Objective questions

1. The Prague School.
2. Surface forms.
3. Optimality Theory.
4. Tonal.
5. Abstract.

Short-answer questions

6. A phoneme is the smallest unit of sound that distinguishes meaning. In structuralist phonology, phonemes are identified through minimal pairs and contrastive distribution.
7. English plurals: /s/ after voiceless sounds (*cats*), /z/ after voiced sounds (*dogs*), /ɪz/ after sibilants (*horses*).
8. Markedness refers to the relative complexity of sounds, with unmarked sounds being simpler, more common, and easier to produce.
9. Usage-based phonology emphasises frequency and repeated use, showing how patterns emerge from experience and cognitive processes.
10. Computational linguistics, psycholinguistics, and language acquisition research.

Long-answer questions

11. *Basic response:* The Prague School introduced distinctive features and markedness, moving beyond listing phonemes to analysing their properties. *Value-added response:* Their work influenced later frameworks by highlighting functional contrasts and universals, shaping generative and contemporary theories.
12. *Basic response:* Optimality Theory explains outputs through ranked constraints, while rule-based phonology uses explicit rules. *Value-added response:* OT offers flexibility and cross-linguistic adaptability but can be criticised for lack of learnability. Rule-based phonology provides clarity in transformations but may struggle with exceptions. Evaluating both highlights the tension between formal precision and explanatory breadth.
13. *Basic response:* Autosegmental phonology is applied to tonal languages, while prosodic phonology explains stress and rhythm in languages like English. *Value-added response:* Cross-linguistic applications demonstrate adaptability, with frameworks used in documenting



endangered languages, analysing morphophonemic alternations, and integrating with computational models for speech technology.

Answers to Pilot Questions [Series 4]

Part 4.1 Classical frameworks in phonology

1. Structuralist phonology.
2. The Prague School.
3. Distinctive features.
4. Markedness.
5. Clarity.

Part 4.2 Generative frameworks

1. Noam Chomsky and Morris Halle.
2. Underlying representations.
3. English plural alternations (e.g., *cats* /s/, *dogs* /z/, *horses* /ɪz/).
4. Lexical phonology.
5. Intonational phrase.

Part 4.3 Contemporary frameworks

1. Optimality Theory.
2. Frequency and repeated use.
3. Prosodic phonology.
4. Tone.
5. Frequency effects on phonological patterns.

Part 4.4 Applications and critiques of frameworks

1. It was criticised for being overly abstract.
2. Autosegmental phonology.
3. Stress and rhythm in languages such as English and French.
4. The balance between formal precision and functional explanation.
5. Computational linguistics, psycholinguistics, and language acquisition.

References and Attributions [Series 4]

General References Chomsky, N., & Halle, M. (1968). *The sound pattern of English*. Harper & Row. Goldsmith, J. (1990). *Autosegmental and metrical phonology*. Basil Blackwell. Hayes, B. (1995). *Metrical stress theory: Principles and case studies*. University of Chicago Press.



Kenstowicz, M. (1994). *Phonology in generative grammar*. Blackwell. Prince, A., & Smolensky, P. (1993/2004). *Optimality Theory: Constraint interaction in generative grammar*. Blackwell. Spencer, A. (1996). *Phonology: Theory and description*. Blackwell. Trubetzkoy, N. S. (1939/1969). *Principles of phonology*. University of California Press.

Illustrations

- *Figure 4.1 Structuralist phonology and phoneme identification* AI-generated using prompt: “Create a diagram showing minimal pairs used to identify phonemes in structuralist phonology.” Suggested OER source: “structuralist phonology phoneme identification OER linguistics.”
- *Table 4.1 Contributions of the Prague School* AI-generated using prompt: “Create a table summarising distinctive features and markedness with examples from phonology.” Suggested OER source: “Prague School phonology distinctive features markedness OER linguistics.”
- *Box 4.1 Functionalist perspectives in phonology* AI-generated using prompt: “Generate a box summarising functionalist perspectives in phonology with examples of articulation and perception.” Suggested OER source: “functionalist phonology communication clarity OER linguistics.”
- *Figure 4.2 Generative phonology in SPE* AI-generated using prompt: “Create a diagram showing underlying representation transformed into surface form by phonological rules.” Suggested OER source: “generative phonology SPE underlying surface forms OER linguistics.”
- *Table 4.2 Examples of rule-based phonology* AI-generated using prompt: “Create a table showing English plural morpheme alternations with examples cats, dogs, horses.” Suggested OER source: “rule-based phonology English plural alternations OER linguistics.”
- *Box 4.2 Lexical phonology and prosodic hierarchy* AI-generated using prompt: “Generate a box summarising lexical phonology and prosodic hierarchy with examples.” Suggested OER source: “lexical phonology prosodic hierarchy OER linguistics.”
- *Figure 4.3 Optimality Theory and constraint ranking* AI-generated using prompt: “Create a diagram showing constraint ranking in Optimality Theory with examples of outputs.” Suggested OER source: “Optimality Theory phonology constraint ranking diagram OER linguistics.”
- *Box 4.3 Usage-based phonology* AI-generated using prompt: “Generate a box summarising usage-based phonology with examples of frequency effects.” Suggested OER source: “usage-based phonology frequency effects OER linguistics.”
- *Table 4.3 Prosodic and autosegmental phonology* AI-generated using prompt: “Create a table summarising prosodic hierarchy levels and autosegmental tiers with examples.” Suggested OER source: “prosodic phonology autosegmental tiers OER linguistics.”
- *Table 4.4 Strengths and limitations of phonological frameworks* AI-generated using prompt: “Create a table comparing strengths and limitations of structuralist, generative,



and contemporary phonological frameworks.” Suggested OER source: “phonological frameworks strengths limitations comparison OER linguistics.”

- *Plate 4.4 Cross-linguistic application of autosegmental phonology* AI-generated using prompt: “Generate an image showing tonal patterns in Yoruba or Mandarin with autosegmental tiers.” Suggested OER source: “autosegmental phonology tonal languages Yoruba Mandarin OER linguistics.”
- *Box 4.4 Current debates and future directions in phonology* AI-generated using prompt: “Generate a box summarising current debates in phonology and future directions with examples.” Suggested OER source: “current debates phonology computational linguistics future directions OER.”

Course code: LIN 301

Course title: Phonology

Course credit load: 2 Units

Series 1: Foundations of Phonological Knowledge

Series 2: Analyzing Sound Patterns and Systems

Series 3: Principles and Methodologies of Phonological Analysis

Series 4: Conceptual Frameworks in Phonology

Series 5: Applied Phonological Discovery and Production

Proposed Outline for Series 5

Part .1 Phonological discovery methods

- 5.1.1 Data elicitation and transcription in applied contexts
- 5.1.2 Identifying phonemic contrasts and allophonic variation
- 5.1.3 Using minimal pairs and distinctive features for discovery

Part .2 Phonological rule application

- 5.2.1 Formulating and testing phonological rules
- 5.2.2 Morphophonemic alternations in real data
- 5.2.3 Cross-linguistic examples of rule application

Part .3 Phonological production in practice

- 5.3.1 Pronunciation training and language teaching applications
- 5.3.2 Speech technology and phonological modelling
- 5.3.3 Clinical applications in speech therapy



Part .4 Integrative project and critique

- 5.4.1 Applying frameworks to real-world phonological data
- 5.4.2 Evaluating strengths and limitations of applied approaches
- 5.4.3 Future directions in applied phonology

Introduction

In the last Series, we explored conceptual frameworks in phonology, examining how different theoretical traditions shape our understanding of sound systems. Building on that foundation, this Series turns to the practical side of phonology, where discovery and production come together. It is here that theory meets application, allowing you to see how phonological analysis is carried out in real-world contexts such as language teaching, speech technology, and clinical practice.

The aim of this Series is to equip you with the skills needed to discover phonological patterns in data, apply rules systematically, and produce accurate phonological outputs in applied settings. By the end, you should be able to connect theoretical insights with practical tasks, demonstrating how phonology operates beyond the classroom and into everyday communication.

We shall commence this Series by focusing on phonological discovery methods, including elicitation, transcription, and the identification of contrasts. Next, we will move on to phonological rule application, where you will learn how to formulate and test rules using real data. Following that, we will explore phonological production in practice, considering applications in pronunciation training, speech technology, and clinical contexts. Finally, we will wrap up with an integrative project and critique, where you will apply frameworks to real-world data, evaluate their strengths and limitations, and reflect on future directions in applied phonology.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 5.1** demonstrate how to elicit and transcribe phonological data in applied contexts,
- **SLO 5.2** identify phonemic contrasts and allophonic variation using minimal pairs and distinctive features,
- **SLO 5.3** formulate phonological rules and test them against real data,
- **SLO 5.4** analyse morphophonemic alternations across different languages,
- **SLO 5.5** apply phonological principles to pronunciation training in language teaching,
- **SLO 5.6** explain how phonological modelling supports speech technology applications,
- **SLO 5.7** evaluate the role of phonological analysis in clinical speech therapy practice, and
- **SLO 5.8** design an integrative project that applies frameworks to real-world phonological data and critiques their effectiveness.



5.1 Phonological Discovery Methods

Phonological discovery methods are the practical techniques used to uncover the sound systems of languages. They involve collecting speech data, transcribing it accurately, and identifying contrasts that reveal the underlying phonological structure. In this Part, we will explore three key areas: data elicitation and transcription, identifying phonemic contrasts and allophonic variation, and using minimal pairs and distinctive features for discovery.

5.1.1 Data elicitation and transcription in applied contexts

Data elicitation refers to the process of gathering speech samples from speakers for analysis. This may involve structured word lists, targeted interviews, or recordings of natural conversations. **Transcription** is the representation of speech sounds using a consistent system such as the **International Phonetic Alphabet (IPA)**, which ensures that sounds are recorded precisely for later analysis.

Fill in the blank: Transcription uses a consistent system such as the _____ to represent speech sounds.

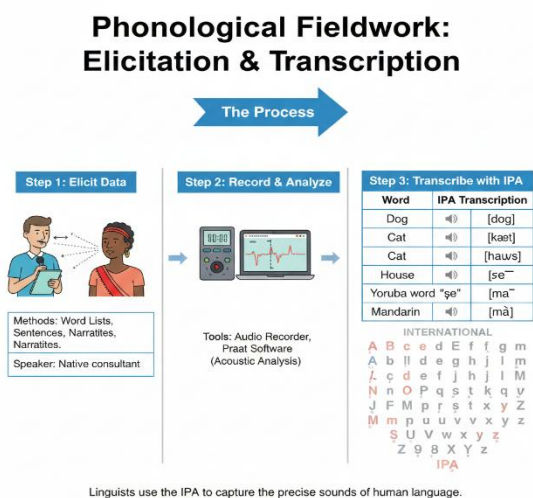


Figure 5.1 Data elicitation and transcription in phonology

5.1.2 Identifying phonemic contrasts and allophonic variation

A **phonemic contrast** occurs when two sounds distinguish meaning, as in *pat* vs *bat*. An **allophone** is a variant of a phoneme that does not change meaning, such as the aspirated [p^h] in *pin* compared to the unaspirated [p] in *spin*. Identifying these contrasts and variations is central to phonological discovery, as they reveal how sounds function within a language.

Fill in the blank: An allophone is a variant of a _____ that does not change meaning.



Phoneme 1	Phoneme 2	Word 1	Word 2	Contrastive Feature
/p/	/b/	Pat	Bat	Voicing (Voiceless vs. Voiced)
/t/	/d/	Tip	Dip	Voicing
/k/	/g/	Kill	Gill	Voicing
/ɪ/	/i/	Bit	Beet	Vowel Height/Tenseness

Phoneme	Allophones	Environment	Examples
/p/	$[p^h]$ (Aspirated)	At the beginning of a stressed syllable.	Pit [p^hɪt]
	$[p]$ (Unaspirated)	After an /s/.	Spit [spɪt]



	Phoneme 1		Phoneme 2	Word 1	Word 2	Contrastive Feature
			t			
/t/	[tʰ] (Aspirated)	Word-initial position.	Top			
	[r] (Flap)	Between two vowels (first is stressed).	Water			
/l/	[l] (Clear l)	Before a vowel.	Leaf			



	Phoneme 1		Phoneme 2	Word 1	Word 2	Contrastive Feature
		At the end of a word or before a consonant.	[p]	pool	put	Place of articulation

Table 5.1 Phonemic contrasts and allophonic variation

5.1.3 Using minimal pairs and distinctive features for discovery

Minimal pairs are pairs of words that differ by only one sound, such as *cat* and *bat*. They are used to establish phonemes in a language. **Distinctive features** are the basic sound properties (e.g., voicing, nasality, place of articulation) that differentiate phonemes. Together, minimal pairs and distinctive features provide a systematic way to discover the sound inventory of a language.

Fill in the blank: Minimal pairs are used to establish _____ in a language.

Tool	Purpose	Key Question
Minimal Pairs	Identify the Inventory	Does changing the sound change the meaning?
Distinctive Features	Identify the Mechanism	What specific physical trait makes these sounds different?

Box 5.1 Minimal pairs and distinctive features

Pilot questions 5.1

1. What system is commonly used for transcription in phonology?
2. What is the difference between a phonemic contrast and an allophone?
3. Give one example of a minimal pair in English.
4. What are distinctive features in phonology?
5. Why is transcription important in phonological discovery?



5.2 Phonological Rule Application

Phonological rule application is the stage where linguists move from discovery to explanation. Once phonemes and contrasts have been identified, rules are formulated to account for how sounds change in different contexts. These rules help explain alternations, morphophonemic patterns, and cross-linguistic variation. In this Part, we will explore how rules are formulated and tested, examine morphophonemic alternations, and consider cross-linguistic examples of rule application.

5.2.1 Formulating and testing phonological rules

A **phonological rule** is a formal statement that describes how a sound changes in a specific environment. For example, in English, voiceless stops like /p/ become aspirated [p^h] at the beginning of a stressed syllable. Rules are tested against data to ensure they account for observed patterns without overgeneralising.

Fill in the blank: A phonological rule describes how a sound changes in a specific _____.

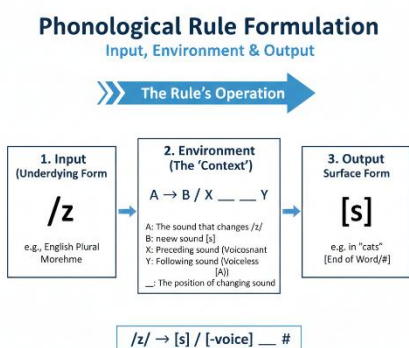


Figure 5.2 Formulating and testing phonological rules

5.2.2 Morphophonemic alternations in real data

Morphophonemic alternations occur when morphemes change their phonological form depending on context. For example, the English past tense morpheme appears as [t] in *walked*, [d] in *played*, and [ɪd] in *wanted*. These alternations demonstrate how phonological rules interact with morphology.

Fill in the blank: The English past tense morpheme appears as [t], [d], or _____ depending on context.



Surface Form (SF)	Phonetic Environment	Examples	Phonological Rule
[t]	After a voiceless non-alveolar stop (e.g., /p, k, f, s, ʃ, tʃ/)	Walked ([wɔ:kt]), Laughed ([læft])	Devoicing: The voiced /d/ becomes voiceless [t] to match the preceding voiceless consonant.
[d]	After a voiced non-alveolar stop (e.g., /b, g, v, z, m, n, l/) or any vowel	Played ([pleɪd]), Robbed ([ɹɪabd])	Identity: The surface form remains identical to the underlying mental form.
[əd] (or [ɪd])	After alveolar stops (/t/ or /d/)	Wanted ([wantəd]), Needed ([nɪdəd])	Epenthesis: A vowel is inserted to separate two similar "hitting" sounds at the same point of articulation.

Table 5.2 Morphophonemic alternations in English past tense

5.2.3 Cross-linguistic examples of rule application

Phonological rules are not unique to English but occur across languages. In Spanish, voiced stops like /b/ and /d/ become fricatives [β] and [ð] between vowels. In Yoruba, high tones may spread to adjacent syllables, showing how tonal rules operate. These examples highlight the universality of phonological processes while demonstrating language-specific variation.

Fill in the blank: In Spanish, voiced stops like /b/ become _____ between vowels.

Language	Process Name	Triggering Environment	Functional Goal
Spanish	Spirantization	Between vowels (\$V _ _ V\$)	Articulatory Ease: Less effort to not fully close the mouth.
Yorùbá	Vowel Elision	Word boundaries (\$V + V\$)	Rhythmic Flow: Prevents a "hiccup" in the syllable-timed rhythm.

Box 5.2 Cross-linguistic phonological rules

Pilot questions 5.2

1. What does a phonological rule describe?



2. Give one example of a morphophonemic alternation in English.
3. What are the three forms of the English past tense morpheme?
4. In Spanish, what happens to voiced stops between vowels?
5. How does Yoruba illustrate tonal phonological rules?

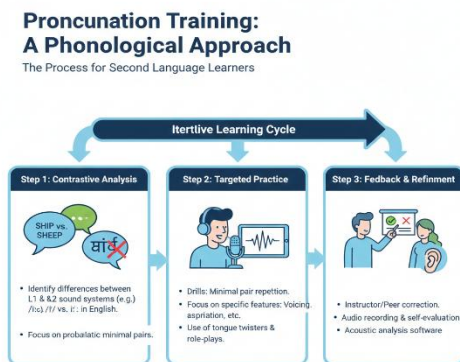
5.3 Phonological Production in Practice

Phonological production in practice focuses on how phonological knowledge is applied in real-world contexts. This involves pronunciation training, speech technology, and clinical applications. By examining these areas, you will see how phonological theory supports practical outcomes in teaching, technology, and therapy.

5.3.1 Pronunciation training and language teaching applications

Pronunciation training uses phonological insights to help learners produce accurate sounds in a second language. Teachers often rely on **contrastive analysis**, which compares the learner's native language with the target language to identify potential difficulties. For example, learners whose native language lacks certain sounds, such as the English "th," may require targeted practice.

Fill in the blank: Pronunciation training often uses _____ analysis to compare native and target languages.



Combining linguistic theory with practice leads to improved intelligibility and confidence.

Figure 5.3 Pronunciation training in language teaching

5.3.2 Speech technology and phonological modelling

Speech technology relies on phonological modelling to improve systems such as speech recognition and text-to-speech. Phonological rules and prosodic patterns are integrated into algorithms to make machines better at processing natural language. For example, stress assignment rules help text-to-speech systems sound more natural.



Fill in the blank: Speech technology integrates phonological rules and _____ patterns into algorithms for natural processing.

Application Area	Phonological Component	Function in Technology	Impact on Performance
Speech Recognition (ASR)	Allophonic Variation	Helps the system recognize that \$[p^h]\$ and \$[p]\$ are the same phoneme (/p/).	Increased accuracy across different speakers and environments.
	Pronunciation Lexicons	Maps the spelling of words to their underlying phonemic representations.	Essential for handling homographs (e.g., <i>read</i> [rid] vs. <i>read</i> [rɛd]).
Text-to-Speech (TTS)	Prosodic Hierarchy	Determines where to place pauses and stress at the phrase and sentence level.	Prevents "robotic" speech; makes the AI sound like it understands the context.
	Phonological Rules	Automatically applies rules like flapping or nasalization to synthetic speech.	Makes synthesized voices sound more "native" and less clinical.
Language Learning Apps	Minimal Pair Analysis	Compares a student's output against a model to identify specific phonemic errors.	Provides targeted feedback on sounds that change word meanings.

Table 5.3 Phonological modelling in speech technology

5.3.3 Clinical applications in speech therapy

Speech therapy applies phonological analysis to diagnose and treat speech disorders. Therapists identify phonological processes that may be delayed or atypical, such as cluster reduction (*spoon* → *poon*) or final consonant deletion (*cat* → *cə*). Treatment involves exercises that encourage correct production and reinforce phonological contrasts.

Fill in the blank: In speech therapy, cluster reduction occurs when a consonant _____ is simplified.



Process	Description	Example	Typical Age of Elimination
Cluster Reduction	Deleting a consonant from a group.	"Stop" → "top"	4–5 years
Final Consonant Deletion	Dropping the last sound of a word.	"Cup" → "cu"	3 years
Velar Fronting	Replacing "back" sounds (/k, g/) with "front" sounds (/t, d/).	"Go" → "do"	3.5 years
Stopping	Replacing a fricative (/s, f/) with a stop (/t, p/).	"Sun" → "tun"	3–5 years (varies by sound)

Box 5.3 Clinical applications in speech therapy

Pilot questions 5.3

1. What type of analysis is used in pronunciation training to compare native and target languages?
2. How do phonological rules support text-to-speech systems?
3. Give one example of a phonological process treated in speech therapy.
4. What role does prosody play in speech technology?
5. Why is phonological knowledge important in language teaching?

5.4 Integrative Project and Critique

The integrative project and critique bring together everything you have learned in this Series. This Part focuses on applying phonological frameworks to real-world data, evaluating their effectiveness, and reflecting on future directions in applied phonology. It is designed to help you consolidate your skills and demonstrate how phonological theory and practice work hand in hand.

5.4.1 Applying frameworks to real-world phonological data

In applied phonology, frameworks are used to analyse authentic language data. This may involve working with recordings of natural speech, classroom pronunciation exercises, or clinical case studies. By applying frameworks such as generative phonology, Optimality Theory, or prosodic analysis, you can uncover patterns and propose explanations that are both theoretically sound and practically useful.



Fill in the blank: Applied phonology often involves analysing authentic _____ data using theoretical frameworks.

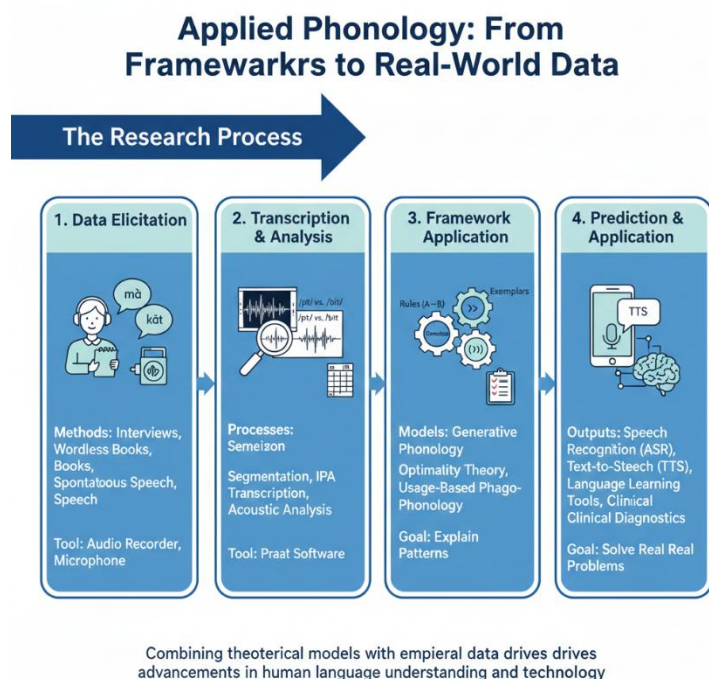


Figure 5.4 Applying frameworks to real-world phonological data

5.4.2 Evaluating strengths and limitations of applied approaches

Every applied approach has strengths and limitations. For example, generative phonology provides precise rule-based explanations but may be too abstract for classroom teaching. Usage-based phonology highlights frequency and learner experience but can lack formal rigour. Evaluating these approaches helps you decide which framework is most effective for a given context.

Fill in the blank: Generative phonology provides precise explanations but is often criticised for being too _____.

Context	Core Application	Major Strengths	Primary Limitations
Language Teaching (L2 Acquisition)	Contrastive Analysis: Identifying sounds in English that don't exist in the learner's native language (L1).	Focuses on intelligibility and communicative success; highly personalized to the student.	"Fossilization" (errors becoming permanent); hard to measure progress without specialized software.



Context	Core Application	Major Strengths	Primary Limitations
Speech Technology (ASR/TTS)	Feature Extraction: Breaking speech into mathematical data points (features like nasality or pitch).	Massive Scalability: Can process millions of voices instantly; consistent and objective.	Struggles with creative language or extreme accents; often lacks "emotional" nuance in prosody.
Speech Therapy (Clinical)	Phonological Processes: Correcting systematic patterns of simplification (e.g., stopping or fronting).	Addresses the root cause of speech disorders rather than just individual sounds; high impact on life quality.	Highly time-intensive ; requires significant parental/caregiver involvement for success.

Table 5.4 Strengths and limitations of applied phonological approaches

5.4.3 Future directions in applied phonology

Applied phonology continues to evolve, integrating with fields such as computational linguistics, psycholinguistics, and speech technology. Future directions include developing more accurate speech recognition systems, refining pronunciation training tools, and improving therapy techniques for speech disorders. These innovations show how phonology remains relevant and dynamic in addressing human communication needs.

Fill in the blank: Future directions in applied phonology include integration with computational linguistics and _____ technology.

Field	Old Approach	Future Direction
Computational	Manual rule-writing.	Statistical learning & Deep Learning.
Psycho/Neuro	Intuition-based models.	Experimental & Brain-imaging data.
Technology	Robotic, flat synthesis.	Emotionally aware, prosodic AI.

Box 5.4 Future directions in applied phonology

Pilot questions 5.4

1. What type of data is analysed in applied phonology?
2. What is one criticism of generative phonology in applied contexts?



3. Which framework highlights frequency and learner experience?
4. Name one field that applied phonology is integrating with for future development.
5. Why is evaluating strengths and limitations important in applied phonology?

Series Summary

This Series has focused on the applied dimension of phonology, showing how theoretical insights are used to discover, explain, and produce sound patterns in real-world contexts. Its purpose was to bridge the gap between abstract frameworks and practical applications, highlighting the relevance of phonological knowledge in teaching, technology, and clinical practice.

We began with phonological discovery methods, examining elicitation, transcription, and the identification of contrasts. Then we moved on to phonological rule application, where you learned to formulate and test rules and explore morphophonemic alternations across languages. Following that, we considered phonological production in practice, looking at pronunciation training, speech technology, and speech therapy. Finally, we concluded with an integrative project and critique, applying frameworks to authentic data and reflecting on future directions. By completing this Series, you should now be able to demonstrate discovery techniques, apply and analyse rules, evaluate applied approaches, and design practical projects, as outlined in the Series Learning Outcomes.

Glossary of Terms

Allophone: A variation of a phoneme that does not change meaning, such as the aspirated [p^h] in *pin* compared to the unaspirated [p] in *spin*.

Contrastive analysis: A method used in language teaching that compares the learner's native language with the target language to identify potential pronunciation difficulties.

Data elicitation: The process of gathering speech samples from speakers for phonological analysis, often through interviews, word lists, or recordings.

Distinctive features: The basic sound properties, such as voicing or nasality, that differentiate one phoneme from another.

International Phonetic Alphabet (IPA): A standardised system of symbols used to represent speech sounds consistently across languages.

Minimal pair: Two words that differ by only one sound, used to establish phonemes in a language (e.g., *cat* vs *bat*).

Morphophonemic alternation: A change in the phonological form of a morpheme depending on its context, such as the English past tense ending appearing as [t], [d], or [ɪd].



Phonemic contrast: A difference between sounds that changes meaning, such as /p/ and /b/ in *pat* vs *bat*.

Phonological rule: A formal statement describing how a sound changes in a specific environment, such as aspiration of voiceless stops at the beginning of stressed syllables.

Prosody: The rhythm, stress, and intonation patterns of speech that influence how language sounds and is understood.

Speech therapy: A clinical practice that uses phonological analysis to diagnose and treat speech disorders, often focusing on delayed or atypical phonological processes.

Transcription: The representation of speech sounds using a consistent system, most commonly the International Phonetic Alphabet (IPA).

Usage-based phonology: An approach that emphasises the role of frequency and repeated use in shaping phonological patterns.

Voiced stop: A consonant sound produced with vocal cord vibration and complete closure in the mouth, such as /b/ or /d/.

Voiceless stop: A consonant sound produced without vocal cord vibration and complete closure in the mouth, such as /p/ or /t/.

Concept Check Questions [Series 5]

Objective questions

1. Which system is most commonly used for transcription in phonology? (Linked to SLO 5.1)
2. An allophone is a variant of a _____ that does not change meaning. (Linked to SLO 5.2)
3. What are the three forms of the English past tense morpheme? (Linked to SLO 5.4)
4. Pronunciation training often uses _____ analysis to compare native and target languages. (Linked to SLO 5.5)
5. In Spanish, voiced stops like /b/ become _____ between vowels. (Linked to SLO 5.3)

Short-answer questions

6. Define a minimal pair and give one example in English. (Linked to SLO 5.2)
7. Explain what a phonological rule describes. (Linked to SLO 5.3)
8. Identify one phonological process treated in speech therapy. (Linked to SLO 5.7)
9. Describe how prosody supports text-to-speech systems. (Linked to SLO 5.6)
10. Name one field that applied phonology is integrating with for future development. (Linked to SLO 5.8)

Long-answer questions



11. Analyse the importance of transcription in phonological discovery. (Linked to SLO 5.1)
12. Evaluate the strengths and limitations of morphophonemic alternations as evidence for phonological rules. (Linked to SLO 5.4)
13. Discuss how phonological knowledge is applied in language teaching, speech technology, and clinical practice. (Linked to SLOs 5.5, 5.6, 5.7)

Answers to Concept Check Questions [Series 5]

Objective questions

1. The International Phonetic Alphabet (IPA).
2. Phoneme.
3. [t], [d], [ɪd].
4. Contrastive analysis.
5. Fricatives (e.g., /b/ → [β]).

Short-answer questions

6. A minimal pair is two words that differ by only one sound, e.g., *cat* vs *bat*.
7. A phonological rule describes how a sound changes in a specific environment.
8. Cluster reduction, e.g., *spoon* → *poon*.
9. Prosody helps assign stress and rhythm, making text-to-speech output sound natural.
10. Computational linguistics.

Long-answer questions

11. *Basic response:* Transcription ensures accurate recording of speech sounds, allowing linguists to analyse phonological patterns systematically. *Value-added response:* Beyond analysis, transcription supports language documentation, teaching pronunciation, and clinical diagnosis, making it essential for applied phonology.
12. *Basic response:* Morphophonemic alternations show how morphemes change form depending on context, providing evidence for phonological rules. *Value-added response:* They also highlight the interaction between morphology and phonology, offering insights into language acquisition and cross-linguistic variation.
13. *Basic response:* In teaching, phonology supports pronunciation training; in technology, it improves speech recognition; in therapy, it helps diagnose and treat speech disorders. *Value-added response:* These applications demonstrate how phonology bridges theory and practice, influencing pedagogy, advancing AI-driven speech systems, and enhancing clinical interventions for communication disorders.

Answers to Pilot Questions [Series 5]

Part 5.1 Phonological discovery methods

1. The International Phonetic Alphabet (IPA).



2. A phonemic contrast distinguishes meaning, while an allophone is a variant of a phoneme that does not change meaning.
3. Example: *cat* vs *bat*.
4. Distinctive features are basic sound properties such as voicing, nasality, or place of articulation.
5. Transcription ensures accurate recording of speech sounds for systematic analysis.

Part 5.2 Phonological rule application

1. A phonological rule describes how a sound changes in a specific environment.
2. Example: English past tense alternation (*walked* [t], *played* [d], *wanted* [ɪd]).
3. [t], [d], [ɪd].
4. They become fricatives (e.g., /b/ → [β]).
5. Yoruba illustrates tonal rules where high tones spread to adjacent syllables.

Part 5.3 Phonological production in practice

1. Contrastive analysis.
2. Phonological rules guide stress assignment and rhythm, making text-to-speech systems sound natural.
3. Cluster reduction, e.g., *spoon* → *poon*.
4. Prosody provides rhythm, stress, and intonation patterns that improve speech technology outputs.
5. Phonological knowledge helps learners produce accurate sounds and supports effective teaching.

Part 5.4 Integrative project and critique

1. Authentic speech data.
2. It is often criticised for being too abstract.
3. Usage-based phonology.
4. Computational linguistics.
5. It helps determine which framework is most effective for a given applied context.

References and Attributions [Series 5]

General References Chomsky, N., & Halle, M. (1968). *The sound pattern of English*. Harper & Row. Goldsmith, J. (1990). *Autosegmental and metrical phonology*. Basil Blackwell. Hayes, B. (1995). *Metrical stress theory: Principles and case studies*. University of Chicago Press. Kenstowicz, M. (1994). *Phonology in generative grammar*. Blackwell. Prince, A., & Smolensky, P. (2004). *Optimality Theory: Constraint interaction in generative grammar*. Blackwell. Spencer, A. (1996). *Phonology: Theory and description*. Blackwell. Trubetzkoy, N. S. (1969). *Principles of phonology*. University of California Press.

Illustrations

- *Figure 5.1 Data elicitation and transcription in phonology* AI-generated using prompt: “Create a diagram showing data elicitation from speakers and transcription using IPA



symbols.” Suggested OER source: “phonological data elicitation transcription IPA OER linguistics.”

- *Table 5.1 Phonemic contrasts and allophonic variation* AI-generated using prompt: “Create a table showing phonemic contrasts and allophonic variation with examples in English.” Suggested OER source: “phonemic contrast allophonic variation examples OER linguistics.”
- *Box 5.1 Minimal pairs and distinctive features* AI-generated using prompt: “Generate a box summarising minimal pairs and distinctive features with examples.” Suggested OER source: “minimal pairs distinctive features phonology OER linguistics.”
- *Figure 5.2 Formulating and testing phonological rules* AI-generated using prompt: “Create a diagram showing the formulation of a phonological rule with input, environment, and output.” Suggested OER source: “phonological rule formulation environment output OER linguistics.”
- *Table 5.2 Morphophonemic alternations in English past tense* AI-generated using prompt: “Create a table showing morphophonemic alternations in English past tense with examples walked, played, wanted.” Suggested OER source: “English past tense morphophonemic alternations OER linguistics.”
- *Box 5.2 Cross-linguistic phonological rules* AI-generated using prompt: “Generate a box summarising cross-linguistic phonological rules with examples from Spanish and Yoruba.” Suggested OER source: “cross-linguistic phonological rules Spanish Yoruba OER linguistics.”
- *Figure 5.3 Pronunciation training in language teaching* AI-generated using prompt: “Create a diagram showing pronunciation training steps: contrastive analysis, targeted practice, and feedback.” Suggested OER source: “pronunciation training phonology contrastive analysis OER linguistics.”
- *Table 5.3 Phonological modelling in speech technology* AI-generated using prompt: “Create a table summarising phonological modelling applications in speech recognition and text-to-speech.” Suggested OER source: “phonological modelling speech technology text-to-speech OER linguistics.”
- *Box 5.3 Clinical applications in speech therapy* AI-generated using prompt: “Generate a box summarising phonological processes in speech therapy with examples cluster reduction and final consonant deletion.” Suggested OER source: “phonological processes speech therapy cluster reduction final consonant deletion OER linguistics.”
- *Figure 5.4 Applying frameworks to real-world phonological data* AI-generated using prompt: “Create a diagram showing the process of applying phonological frameworks to real-world speech data.” Suggested OER source: “applied phonology frameworks real-world data OER linguistics.”
- *Table 5.4 Strengths and limitations of applied phonological approaches* AI-generated using prompt: “Create a table comparing strengths and limitations of applied phonological approaches in teaching, technology, and therapy.” Suggested OER source: “applied phonology strengths limitations teaching therapy technology OER linguistics.”



- *Box 5.4 Future directions in applied phonology* AI-generated using prompt: “Generate a box summarising future directions in applied phonology including computational linguistics and speech technology.” Suggested OER source: “future directions applied phonology computational linguistics speech technology OER linguistics.”

