PHONOLOGICAL RULES: Formalized general statements about the distribution of non-contrastive properties of segments; they provide the phonetic information necessary for the pronunciation of utterances.

INPUT: Phonemic (dictionary) representation of words in a sentence.

OUTPUT: Phonetic representation of words in a sentence.

INPUT: UNPREDICTABLE
OUTPUT: PREDICTABLE

Unpredictable segments are **BASIC** or **UNDERLYING**.

Predictable forms: **DERIVED**

Phonological rules derive phonetic representations (PR) from underlying representations (UR).

FORMALIZATION:

Class of sound Change Conditioning environment: context must be specified!

FOCUS (input) + CONTEXT (environment): **Structural Description** (SD)

output: **Structural Change** (SC)

A → B / x — y

Read: A becomes B between x and y

Minimal feature specification of segment(s) → Features that change / Minimal specification of lefthand context

undergoing the change
NOTATIONS:

C: Represents the features \([-\text{sylalbic} \quad +\text{consonantal}\]\n
V: Represents the features \([+\text{sylalbic} \quad -\text{consonantal}]\)

Zero subscript \(C_0\) represents zero or more consonants

\[
V \rightarrow [-\text{back}] / \quad \text{Co} \quad [V \quad +\text{high}] \quad [-\text{back}]:
\]

---

\(\text{Co} \quad [+\text{high}] \quad [-\text{back}]\) is an abbreviation for:

---

\(V \quad [+\text{high}] \quad [-\text{back}]\)

---

\(C \quad [V \quad +\text{high}] \quad [-\text{back}]\)

---

\(CC \quad [V \quad +\text{high}] \quad [-\text{back}]\)

---

\(CCC \quad [V \quad +\text{high}] \quad [-\text{back}]\)

---

etc.

BRACE NOTATION: \{ \}

This notation combines two or more rules that have identical parts:

\[
C
\]

a. \(V \rightarrow [+\text{long}] / \quad +\text{voice}\)

b. \(V \rightarrow [+\text{long}] / \quad +\text{voice}\)

Combined rule:

\(V \rightarrow [+\text{long}] / \quad \left\{ \begin{array}{c} C \quad [+\text{voice}] \\ # \end{array} \right\}\)
PARENTHESES NOTATION: ( )

Parentheses are used as a formal device for collapsing two similar rules when one contains a specification lacking in the other.

a. \([-\text{continuant}\) [-\text{voice}] \rightarrow [+\text{SG}] / \sigma \quad [+\text{stress}]\]

b. \([-\text{continuant}\) [-\text{voice}] \rightarrow [+\text{SG}] / \sigma \quad \left(\begin{array}{c}
\text{-sonorant} \\
\text{-nasal}
\end{array}\right) \quad [+\text{stress}]\)

Combined rule:
\([-\text{continuant}\) [-\text{voice}] \rightarrow [+\text{SG}] / \sigma \quad \left(\begin{array}{c}
\text{-sonorant} \\
\text{-nasal}
\end{array}\right) \quad [+\text{stress}]\)

Where \textit{braces} are used, each rule to be collapsed contains restrictions not found in the other. With \textit{parentheses}, only one of the rules has an additional restriction.

These notations are employed only for collapsing rules involving the same processes, and \textit{not} any two rules.

Ø : left of the arrow -- insertion  
right of the arrow -- deletion

Ø → \(\nu\) / \(V\) __ 1

C → Ø / ——— #C

ALPHA NOTATION: \(\alpha\)

If two rules are identical except for the values of the same feature, then the two rules can be replaced by a single rule. The values which are different in the two rules are replaced by a variable -- the Greek letter \textit{alpha} -- in the new rule.
e.g. Nasalization in Malay:

mēwāh    luxurious
māyāk    stalk
mārah    ascend
nāēʔ     scold
mālaraŋ  forbid
mākan    eat
rumāh     house
kārāta   car

[-consonantal] → [α nasal] / [α nasal] ———

RULES WITH MULTIPLE VARIABLES: α, β

Turkish (Poss. Suffix)
-im, -üm, im, -um → Vowel Harmony

\[
V_{[+\text{high}]} \rightarrow \left[ \alpha \text{back} \right] / \left[ \alpha \text{back} \right] \text{Co + Co} ———
\]

ANGLED BRACKET NOTATION: < >

Used with rules that involve dependencies between two feature specifications by way of adding a condition to the rule of the form

“if a, then b”

ENGLISH:

critical  [k]    criticism  [s]
opaque    [k]    opacity    [s]
analogue  [g]    analogize  [dʒ]
regal     [g]    regicide  [dʒ]
Velar Softening Rule:

\[
\begin{array}{c}
\text{-anterior} \\
\text{-continuant} \\
\text{<-voice>}
\end{array} \rightarrow \begin{array}{c}
\text{CORONAL} \\
\text{<+ strident} \\
\text{<+ anterior} \\
\text{<+ continuant} \\
\end{array} / \text{---} [\text{+VS}]
\]

[+ VS] Suffixes that condition the change of velars as in this rule.

If [- voice], then
\[
\begin{array}{c}
\text{<+ anterior} \\
\text{<+ continuant}
\end{array}
\]

in addition to
\[
\begin{array}{c}
\text{CORONAL} \\
\text{<+ strident}
\end{array}
\]

FORMALIZATION OF RULES FOR METATHESIS AND COALESCEENCE:

TRANSFORMATIONAL RULES
a. Metathesis

Hanunoo:

?usa \  one \  kas?a \  once
?upat \  four \  kap?at \  four times
?unum \  six \  kan?um \  six times

tulu \  three \  katlu \  three times

The cluster glottal stop and consonant becomes consonant and glottal stop between vowels.

\[
\begin{array}{c}
\text{V} \begin{array}{c}
\text{-continuant} \\
\text{+CG}
\end{array} \\
\text{C V} \rightarrow \ 1 \ 3 \ 2 \ 4
\end{array}
\]

1 \ 2 \ 3 \ 4
b. **Coalescence**

French:

[plɛŋə ]  *full* (Fem.)  [plɛ]  (masc.)

[tɔnalite]  *tonality*  [tɔ]  *tone*

\[
\begin{array}{cccc}
C & 1 \\
V & \text{[+ nasal]} & \# & \rightarrow \text{[+nasal]} & \emptyset & 3 \\
1 & 2 & 3
\end{array}
\]

A vowel plus a nasal consonant becomes a nasalized vowel when the consonant is word-final.