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Examples of English Phrase Structure and Transformational Rules from *Syntactic Structures*

The following phrase structure rules appear on page 111 of *Syntactic Structures*.

\[ \Sigma: \# \text{Sentence} \#^{[1]} \]

\[ F: \]
1. Sentence \( \rightarrow \) NP + VP
2. VP \( \rightarrow \) Verb + NP
3. NP \( \rightarrow \) NP_{sing} + NP_{pl}
4. NP_{sing} \( \rightarrow \) T + N + ∅
5. NP_{pl} \( \rightarrow \) T + N + S^{[2]}
6. T \( \rightarrow \) the
7. N \( \rightarrow \) man, ball, etc.
8. Verb \( \rightarrow \) Aux + V
9. V \( \rightarrow \) hit, take, walk, read, etc.
10. Aux \( \rightarrow \) C(M) (have + en) (be + ing)
11. M \( \rightarrow \) will, can, may, shall, must

The following transformational rules, which appear on pages 112–113 of *Syntactic Structures*, are discussed in this book. Each is given with its *Syntactic Structures* name and, where applicable, the nickname by which it is generally known and under which it is discussed here. (SA = structural analysis; SC = structural change)

12. **Passive** (optional)
   SA: NP – Aux – V – NP
   SC: \( X_1 – X_2 – X_3 – X_4 \rightarrow X_4 – X_2 + be + en – X_1 – by + X \)

15. **Number Transformation** (obligatory)
   SA: \( X – C – Y \)
   SC: \( C \rightarrow \begin{cases} ∅ & \text{in the context NP}_{sing} \\ S & \text{in other contexts} \\ past & \text{in any context} \end{cases} \)

16. **T_{not} “Negation Transformation”** (optional)
   \[ \begin{cases} NP – C – V \ldots \\ NP – C + M \ldots \\ NP – C + have \ldots \\ NP – C + be \ldots \end{cases} \]
   SA: \( X_1 – X_2 – X_3 \rightarrow X_1 – X_2 + n’t – X_3 \)

17. **T_{a} “Affirmation”** (optional)
   SA: same as 16
   SC: \( X_1 – X_2 – X_3 \rightarrow X_1 – X_2 + A – X_3 \)

18. **T_{q} “Subject-Aux Inversion”** (optional)
   SA: same as 16
   SC: \( X_1 – X_2 – X_3 \rightarrow X_2 – X_1 – X_3 \)
19. \( T_{w1} \) “Wh-Movement” (optional and conditional on \( T_8 \))
   SA: X – NP – Y (X or Y may be null)
   SC: same as 18

20. Auxiliary Transformation “Affix Hopping” (obligatory)
   SA: X – “Af” – “v” – Y (where “Af” is any C or is en or ing; “v” is any M or V, or have or be)
   SC: \( X_1 - X_2 - X_3 - X_4 \rightarrow X_1 - X_3 - X_2 \) # – X_4

21a. Word Boundary Transformation (obligatory)\(^4\)
   SA: X – Y (where X ≠ “v” or Y ≠ “Af”)
   SC: \( X_1 - X_2 \rightarrow X_1 - \# X_2 \)

21b. Do-Transformation “Do-Support” (obligatory)
   SA: # – “Af”
   SC: \( X_1 - X_2 \rightarrow X_1 - do + X_2 \)

[1] For brevity, \( S \) is used in this book rather than \textit{Sentence}.
[2] \( s \) is used in this book rather than \( S \) to avoid confusion with the abbreviation \( S \) for \textit{Sentence}.
[3] “V…” (for example) means ‘V followed by anything at all’; it is equivalent to \( V + X \) or \( V \ X \). The notation in \textit{Syntactic Structures} is somewhat inconsistent on this point.
[4] Transformations 21a and 21b are both numbered 21 in \textit{Syntactic Structures}. 